



PROVED PLANS

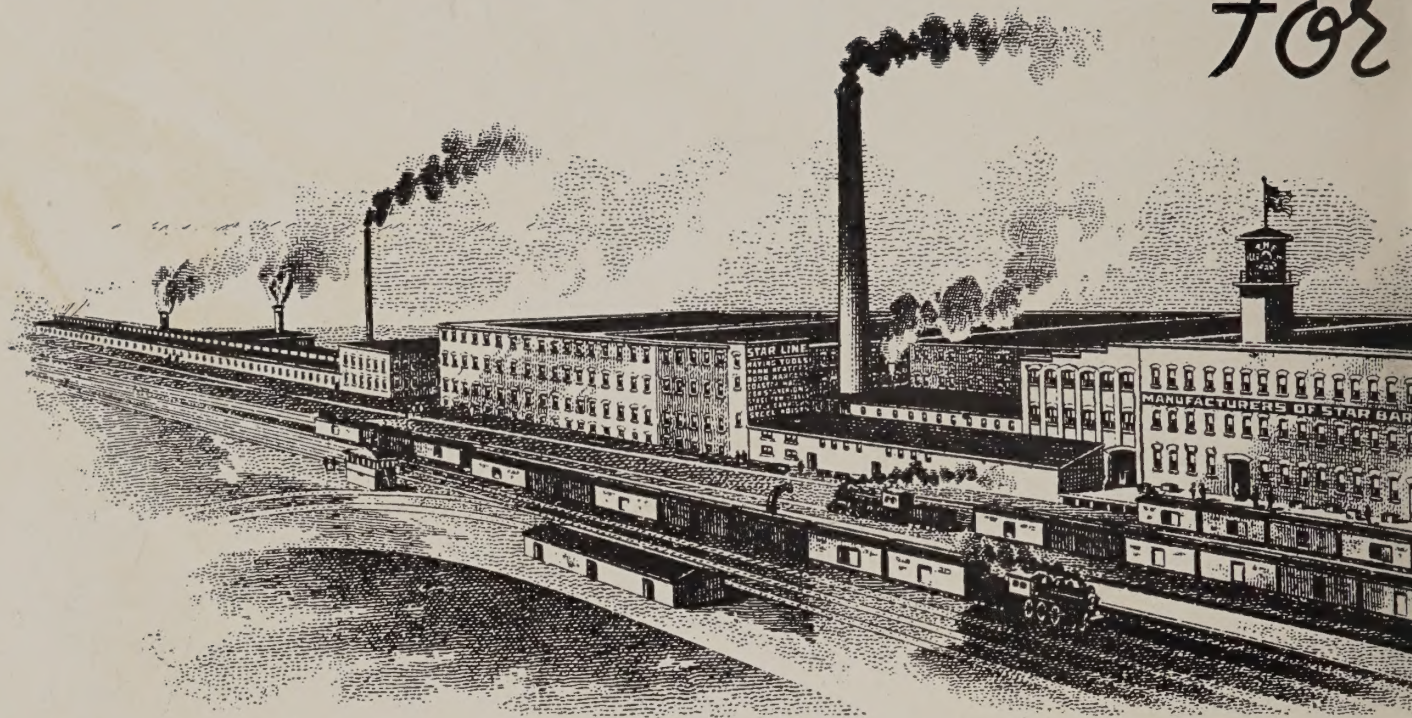
For Building
BARN PROFITS



STARLINE INC.

HARVARD, ILL.
ALBANY, N. Y.

For



Thousands of Farmers Have

From a small beginning in the basement of a hardware store back in 1883, the same people at the same old stand have been building the same sort of dependable equipment to make life pleasanter and work more profitable for the same people—the American farmers.

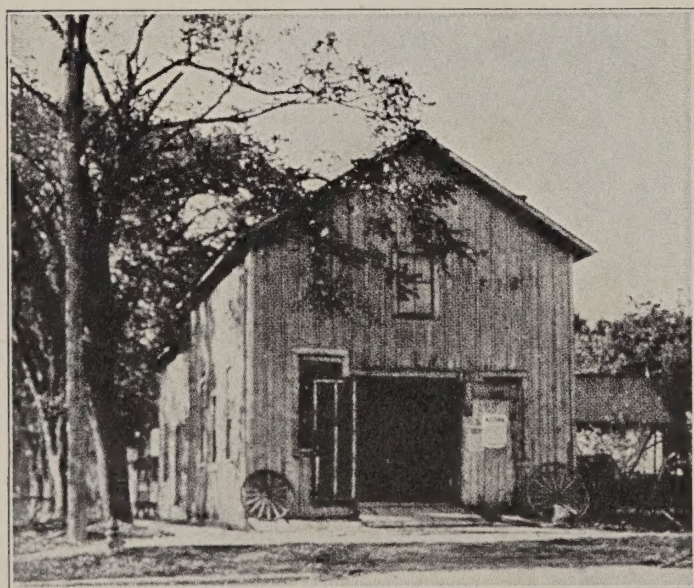
During that time the name STARLINE has come

to stand for the most modern, dependable and practical equipment for all kinds of farm buildings.

The name STARLINE, through sheer merit of the equipment manufactured, advertised and sold by Hunt, Helm, Ferris & Co., became even better known than the company itself. In 1930 to simplify matters the corporate name was changed to STARLINE INC. There was no change of ownership, no change in policy, no change in the high regard for the good will that STARLINE products have built up among thousands of friends in all parts of the country, no change in the rigid determination to supply only the best kind of equipment that a combination of brains, experience and unlimited facilities know how to produce, no change in our obligation to furnish the kind of equipment that 55 years of satisfactory experience has led everybody to expect from STARLINE.

You do not have to depend alone on the STARLINE reputation; our guarantee is definite and positive.

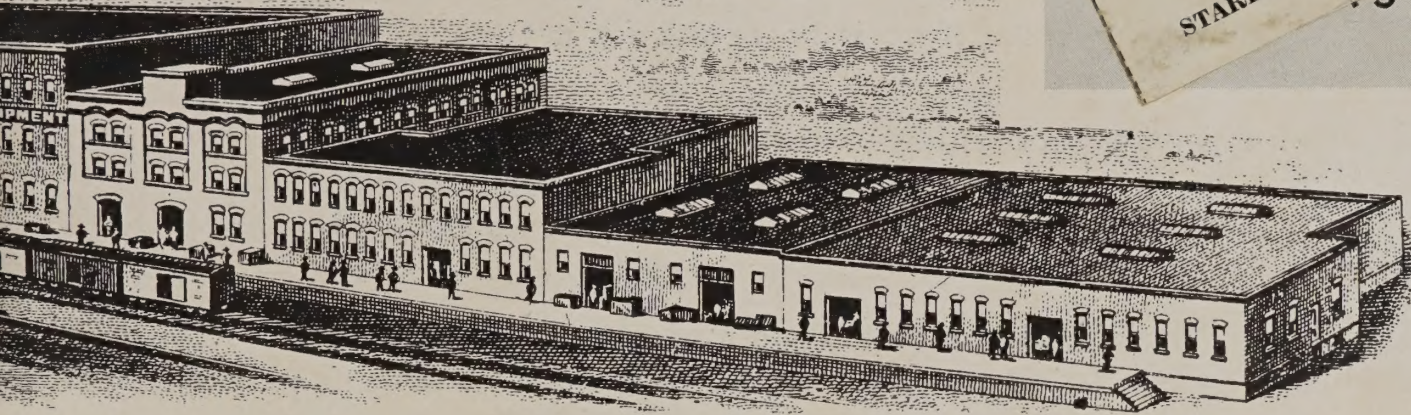
STARLINE doesn't dare disappoint you. Whether your purchase amounts to 50c or \$5000, your satisfaction is assured. If STARLINE equipment doesn't make good—we will.



The Home of STARLINE in 1884

Over 50 YEARS STARLINE

J. E. MANSHARDT
NAPERVILLE, ILLINOIS
Representing
STARLINE INC., Harvard, Illinois



Benefited by STARLINE *Ideas*

For over fifty years STARLINE has been solving problems that have to do with farm buildings and equipment. STARLINE has specialized in this field. These problems are not solved either by narrow personal experience or theoretical ideas. To these problems STARLINE has applied the boiled-down experience of hundreds of thousands of farmers in all sections of the country.

STARLINE has functioned as a clearing-house for ideas, plans, methods and equipment which have proved to be the most practical and profitable.

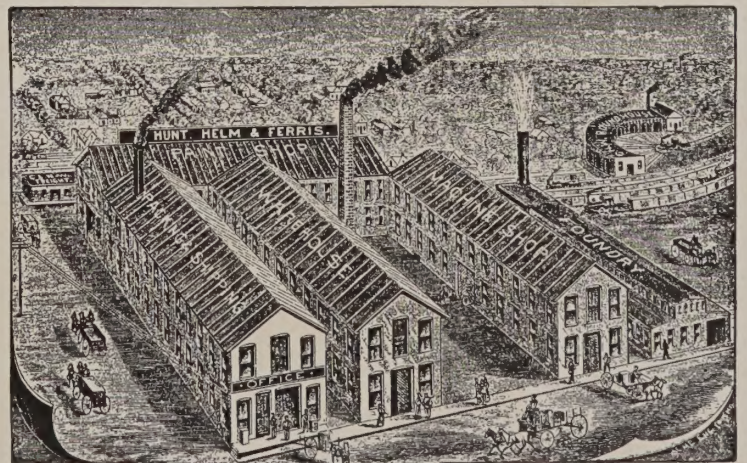
The benefit of this accumulated experience is offered freely and without obligation to those who can use it in connection with the building of any new farm structure or in turning an old one into a practical modern money-maker.

During all this time STARLINE has constantly maintained a thoroughly practical Experimental Department where ideas and equipment are given the most searching tests before offered to the public.

That is why STARLINE equipment is not only dependable but embodies features and ideas whose value shows up profitably in every day use in the

saving of feed, time and labor, in the elimination of useless steps, in the added comfort and safety for farm animals and in greater profits from them through lowered costs and increased production.

These are the definite reasons for STARLINE leadership in barn equipment design. These are the reasons why STARLINE answers every fancy of one who builds the most elaborate barn and at the same time meets every need of the man who realizes that the better he takes care of his stock, the better his stock will take care of him and his family.



The Factory in 1895

COSTS ARE LOW

NOW is the Time!

WITH present low costs, there is no excuse for not having a money making barn.

Whether you have a new barn, or an old one, now is the time to put it into the best money making order. You would be surprised to see how even a little money invested now will return profits for you away beyond what the same dollar would have brought a year or two ago.

If you have been thinking of putting up a new barn, and are able to go ahead with your plans, by all means do so. But, if you are not able to build this year, take advantage of the present market to improve your present barn building. Your increased income makes the investment worth while. New steel equipment can always be moved later to a new building.

Often just a few improvements, here and there, can make a great difference in the value of an old building. Avail yourself of these advantages now when you can do so for so little cost. An old barn, properly improved has some very good advantages over a new building. The old barn has, no doubt, already paid off its overhead and now stands able to make clear profits. Even major improvements invariably cost less than new lumber and labor. You have less money tied up—you save on interest and insurance.

This is the year in which improvements in buildings of any kind can be made away below normal costs. Starline Engineers will be glad to help you with your plans. Let us hear from you.

STARLINE INC.

FORMERLY HUNT-HELM-FERRIS & CO., INC.

HARVARD, ILL.

1031 BROADWAY, ALBANY, N. Y.

*Money May Not Make Folks Happy
But It Buys the Things That Do*

How a Good Barn Can Make Money

YOU own a barn to make money.

A good barn will make money for you by insuring the profits of your intelligent breeding, feeding and care.

It will enable you to save feed, and conduct the necessary work of feeding and cleaning in the most economical way. It will keep your animals clean, safe, healthy and comfortable. It will prevent the losses through disease, accidents, discomfort and restlessness which often keep good animals from producing a profit.



THIS KIND OF BARN YIELDS A PROFIT EVERY YEAR

A Poor Barn Loses Money for You Every Day

SOME of us who keep cows just naturally seem to be magnets for hard luck.

We do most of our own work, keep records, feed carefully, breed carefully and yet through the irony of fate our cows seem to produce well only when milk prices are low.

We're generally just a little behind with our work and when things begin to

look as if they might take a turn for the better, costly accidents or diseases sadly and suddenly blast our hopes.

On the other hand, there are places that are farmed entirely by proxy. The owner trusts the care of his investment to those whose only incentive is a monthly pay check and where they seem to be making a little money even when milk prices are down.

Possibly a comparison of the barns will tell us something.

The barns are different and the difference is not confined to the newness of the paint. It's the differences within the barn that keep one man prosperous and the other man poor.



WHAT CHANCE HAS THIS FARMER TO MAKE MONEY?

How to Find Where You Lost Profits

IN almost any old building that is structurally sound a few changes can be made that would practically head off the hard luck which now follows the owner more closely than a faithful Collie dog.

How can he expect his cows to do their best in a barn that is dingy, dirty and damp? Why does he tolerate conditions which invite nothing but trouble when they can easily be remedied by a little thought and planning? As will be explained later, even this thought and planning can be done for him.

The old barn may be so dark that its other short-comings are not apparent. So the first thing to set down in the way of improvements is to put in more windows like the Starline Steel Windows (Page 60).



WHAT CHANCE HAVE THESE GOOD COWS TO MAKE MONEY?

It takes more than whitewash to make a barn fit place to keep cows profitably.

See that cow lying with her hind quarters in the gutter. Which will it be, a ruined udder or a broken leg? Depends on which way her neighbor steps. What is to prevent these cows from becoming crippled or restless, profitless, nervous wrecks? Contagious abortion often gets the blame where cows strain abdominal muscles standing in the gutter like the three shown above.

comes as a result of slipping as she strains for feed which she can see but cannot reach.

Maybe no one of these items alone means very much, but there are many things wrong with the average barn that can easily and inexpensively be corrected.

How about your own barn?

Let's Face the Facts

Are you really making the money that you should make from the breeding, feeding and care that you give your cows?

Do your cows really have a chance to do their best in your barn?

Do sickness and accidents among your cows cut down your profits?

These are some of the costly troubles Starline Equipment heads off.

Crowding Means Costly Accidents and Reduced Milk Flow

Does every cow really have enough room—or are they a little crowded so that it makes them restless and nervous and makes them hold back on their milk?

Are your cows protected from the crowding and trampling that make them nervous and uneasy and cuts down the milk flow?

Is it possible for one cow to step over and ruin the udder of another that is lying down next to her?

Unhandy Arrangement Means Miles and Miles of Useless Steps

The very arrangement of the barn may make profits impossible.

Such a thing as a new location for a door might shorten the trip from the barn to the residence, from the barn to the milk house, or to some other place. An extra 50 or 60 ft. covered ten or a dozen times a day runs up into forty or fifty useless miles by the time a year rolls around. There may be places in that barn, too, where other thousands of needless steps keep a man just about so far behind and prevent him from making any progress on the road to prosperity.

There may be an inconvenient arrangement of the cow stalls. The work instead of moving in a straight line may involve turning many corners and dodging posts and other obstructions.

Maybe the cows are crowded, restless and uncomfortable. Maybe the owner has not stopped to realize the thousand and one other things that may be the matter with that barn—any one of them enough to keep him from joining the ranks of those who make money with their old barns in spite of conditions.

Proper Mangers Save Feed, Avoid Accidents and Aid Production

Just think of the troubles that may be avoided by such a simple thing as a properly shaped manger. Saving feed is the least important thing a good manger does. With her feed in the right kind of a manger, the cow can easily reach all the feed she can see in front of her. Her stall is never bare of bedding which has been shoved back out of the stall as she strains to get feed that's too far away. She has neither bruised shoulders, big knees, or an abscessed brisket which

You Can Have Your Barn Inspected Without Cost or Obligation. See Page 11.

Is your barn as light as it should be—light enough so the cows can see what's going on around them—light enough so that there are no dark, damp places where the germs of sickness thrive?

Does the work move in straight lines, or are there corners to turn or posts and other obstructions to dodge around?

Is your barn arranged for greatest convenience, or do you have to take some unnecessary steps that might be avoided?

An extra 50 ft. covered both ways four times a day means 30 miles a year. A Northern Illinois farmer saved 180 miles of walking every year just by changing the location of his cream separator.

Have you ever figured out how far you walk in cleaning your barn or in some of the operations that require walking and how much that would amount to in a year?

Cold, Damp Barns Cut Production and Waste Feed

Is your barn as warm as it should be for the best results in milk production?

Does water ever freeze in your stable?

Is your stable as dry as it should be during the winter months, or do the walls and ceiling "sweat"?

Is your stable "drafty?"

Is the straw or other bedding damp?

Does the feed get mouldy?

Does milk production drop during a sudden cold spell?

Discomfort and Restlessness Knock Holes In Profits

Do your cows get restless because they can't see what's going on behind them?

Do some of your cows stand with their hind feet in the gutter?

Do some of your cows stand so far away from the gutter that they can't keep clean?

Do some of your cows get dirty in spite of the fact that they stand as they should with respect to the gutter?

Have any of your cows had bruised shoulders, big knees or abscessed briskets?

Even a Slight Feed Waste Mounts Up in the Long Run

Does some of the feed that you place before your cows get nosed out of the manger?

Do some of your cows seem to work the feed back under their feet and waste it?

Waste usually comes by the teaspoonful and not by the barrel, and one-half pound of feed wasted by one cow doesn't amount to very much, but if forty cows each waste one-half pound of feed every day that runs up to three and one-half tons in a year. This amount of feed even at today's prices would be good interest on a \$1,500.00 investment.

Does bedding stay in place under the cows so they don't have to lie on the bare floor during long, cold winter nights?

A Clean Barn Means Clean Cows—and Clean Milk at a Profit

Is the floor easy to clean and easy to keep clean?

Is the walk behind the cows slippery?

Is the gutter wide and deep enough?

Can your cows get a drink whenever they want it, particularly when eating and at night?

Answer yourself honestly and you'll discover some of the principal common every-day faults in common every-day barns and the common reasons why the average dairy farmer who feeds and breeds with proper care is not making the money that he should.

Now that some of the principal troubles have been located let's see what can be done about it.

**Work
Waste
and
Worry
Can
Often
Be
Greatly
Reduced**



**Safe
Clean
Contented
Cows
Mean
Clean
Milk
At a
Profit**

LIGHT CLEAN, SAFE, COMFORTABLE, CONTENTED AND PROFITABLE

How Convenient Arrangement Saves Time and Money

MOST of our barn troubles grew upon us, so it's hard to realize we have them.

The barn may have been satisfactory when it was built but changes in farm management have made them inefficient.

A tractor may have replaced part of the horses in a general purpose barn, leaving a lot of surplus room in the form of empty horse stalls. Where the number of milk cows has been increased it has been discovered that profits can be made only in clean, warm, well lighted and well ventilated buildings.

Having learned the importance of grinding grain where home mixed rations are fed, extra feed bins and a grinding room have been added. Feed rooms and silos, too, may be so far away that our labor in feeding is many times what it should be.

Here's the arrangement of a typical old sturdy timber frame barn. It's light enough when the doors are open, but when the doors are closed it is dark and heat leaks out through the single board wall like water through a sieve.

But that isn't the worst thing about this barn, although its faults are no more numerous than they are in the average barn built twenty-five years ago.

Better Arrangement Saves Half the Work

The plan below shows a modern arrangement for the same old structure in which there are no corners to turn and no posts to dodge and it's safe to estimate that all the work of feeding, cleaning and caring for both cows and horses can be handled in just about half the time that it could with the old arrangement.

The big heavy wooden posts have been eliminated and replaced by 4 in. steel columns, which are more sanitary and offer less obstruction to light and ventilation.

At the top of each pair of steel columns is a 6x6 bolster, which carries the girders running cross-wise of the building to support the hay mow floor.

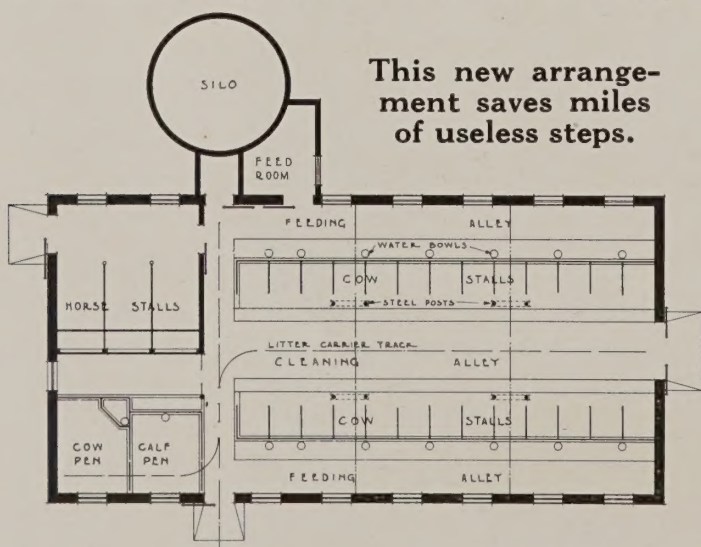
Tight Partition Helps Both Horses and Cows

Wood posts near the horse stalls are buried in the tight partition which separates the horses from the cows.

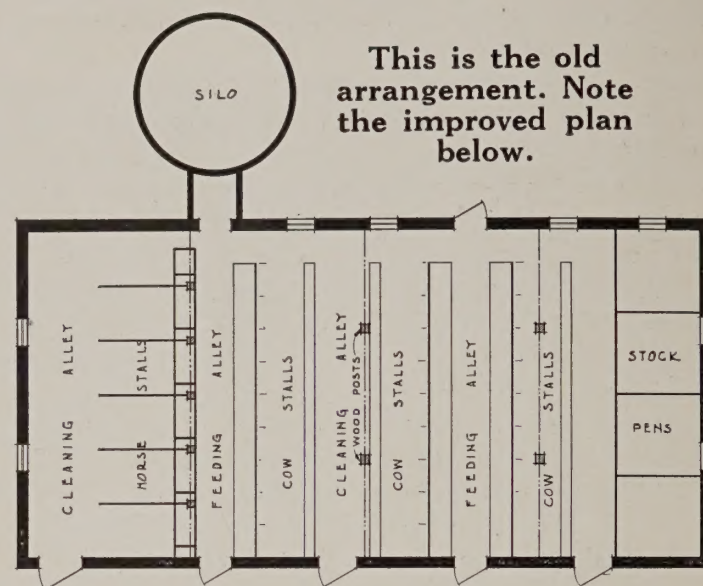
A tight partition separates the horses from the cows for two reasons. First, because milk takes up odors so readily the best grade of milk cannot be produced in the same room with horses.

The second reason is that if horses are kept at the same temperature that is required for the cows to do their best, the horses will suffer and chill when taken out during the winter.

Most of the doors have been closed. Windows have been added so that the light is more than doubled. The new plan



This new arrangement saves miles of useless steps.



This is the old arrangement. Note the improved plan below.

shows an arrangement of 9-light, 9x12 in. glass, which provides about 3 sq. ft. of glass for each cow.

New Concrete Manger Saves Feed and Prevents Accidents

In front of every cow is a manger of the right size and shape so that she cannot waste her feed and will not be under the constant risk of being injured by slipping as she strains to get feed she cannot reach.

Behind every cow is a gutter of sufficient capacity.

A 6-in. curb helps to keep feed from being worked back into the stall and wasted. Starline Unit Stalls greatly increase this saving. See page 32.

No More Udders Ruined by Crowding and Trampling

Each cow has an individual stall. She is separated by partitions from her neighbors on both sides so that there is no crowding or danger of trampling when she lies down.

Each cow has quite a bit more room than she had under the old arrangement. A stall 3 ft. wide is enough for a cow that is not being milked, but for milking cows it is better to have them at least 3 ft. 3 in. and still better to have them either 3 ft. 4 in. or 3 ft. 6 in. as shown in the new plan.

The depth of the stall is, of course, made according to the size of the cows in the herd. For Jerseys the stalls should measure from 4 ft. 4 in. to 4 ft. 8 in. from curb to gutter. For Guernseys from 4 ft. 7 in. to 4 ft. 10 in., for Holsteins, Brown Swiss, Ayrshires and Shorthorns this dimension should be 4 ft. 10 in. to 5 ft. 2 in., according to the average size of the animals in the herd.

Fewer Cows Make More Money Than a Larger Number

In the new plan a few less cows are provided for, but other things being equal, the cows kept in this arrangement will be profitable—they make more actual profit than the larger number did before.

The new plan shows a litter carrier, which without taking into account any other considerations, cuts out three-fourths of the work of cleaning the barn and eliminates six 200 ft. trips with a wheel barrow every day. A total of approximately seventy miles a year of wheelbarrowing is eliminated.

The plan also shows water bowls, which eliminate at least half an hour daily waste of time that it takes to turn cows loose for watering two or three times a day and it definitely and positively increases the milk flow anywhere from ten to twenty per cent.

How to Improve Your Barn Without Increasing Your Total Investment. See Page 11.

How Warm Walls Prevent Wasted Feed and Sudden Drops in Milk Production

ANYBODY who keeps cows knows that a sudden drop in inside stable temperature below the freezing point may cut the milk flow 10% or even more.

With twenty-six cows averaging 30 lbs. of milk a day, the loss would be about 75 lbs. Figuring this at 1c a lb. would mean a loss of about \$.75 in a single day.

Moreover, just one chilling may affect the cow's production for several days or keep it down permanently and in this case the feed that would otherwise go into milk is used up in providing body warmth for the cows.

Tight Walls Keep Out Bad Weather

So while the important work of re-arranging the barn is being done, the equally important work of making the barn walls warm should also be taken care of to head off sudden and costly drops in milk flow.

The battens which cover the cracks between the boards of the vertical siding on a sturdy old timber frame barn should be nailed down tight and those which have fallen off should be replaced to prevent cold winds from blowing into the building.

Insulation Increases Warmth of Walls

Walls sealed with dressed and matched lumber over heavy building paper, leaving an air space between the two layers of boards will keep the stable fairly warm. But as indicated in the illustration at the extreme upper right, if the temperature inside the stable is maintained at 50°, moisture is likely to appear on the inside surface of this wall when the temperature gets down to 22° above zero.

Other illustrations at the right show how good insulating board will warm the walls to a point where moisture appears only at considerably lower temperatures.

Insulation Prevents Cold Walls From Sweating

For walls of solid concrete or masonry, similar insulation could be used not merely to hold in the animal heat but to prevent sweating and frosting of the walls because no matter how warm the inside air may be, there's bound to be some moisture on a *cold* wall.

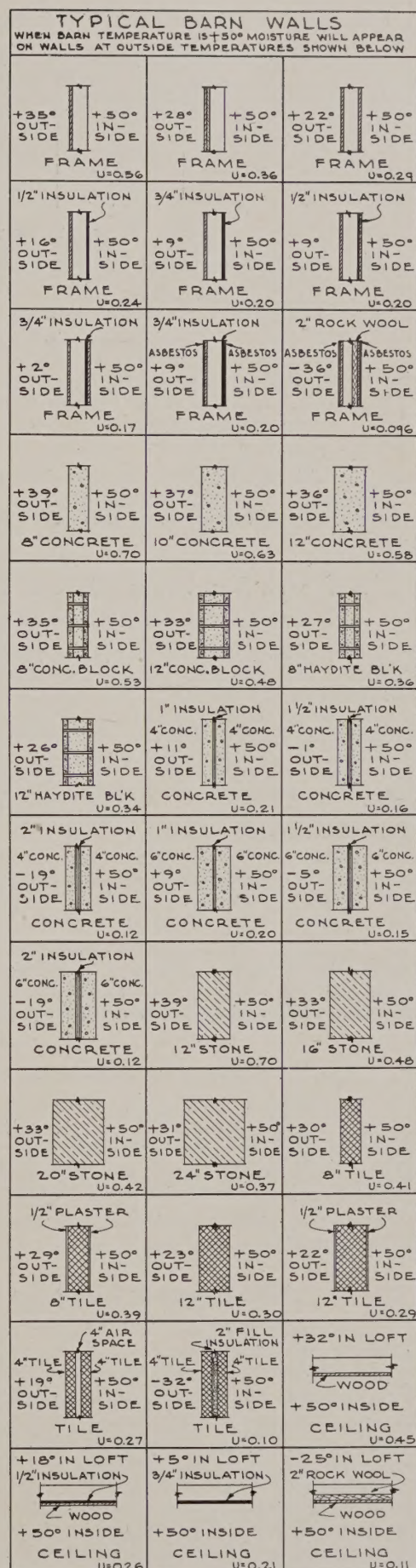
Where a barn is built warm and tight for best results in extremely cold weather, the heat provided by the animals will be more than necessary under ordinary outside temperature conditions. If something is not done about it the stable may sometimes get too warm. Remember the cow's heavy winter coat is not intended for summer temperatures; it is like wearing winter woollens in July. Where the barn is too "close" and warm it makes the cows uncomfortable; it reduces their vitality; it makes them listless and more susceptible to diseases.

Ventilation Disposes of Excess Warmth and Moisture

Moreover, when the wall is built tight and warm it prevents excess moisture from leaking out. According to the United States Department of Agriculture Technical Bulletin No. 187, a cow gives off 12 to 18 lbs. of moisture in a day—enough to cover the surface of her stall floor to the depth of three-sixteenths of an inch.

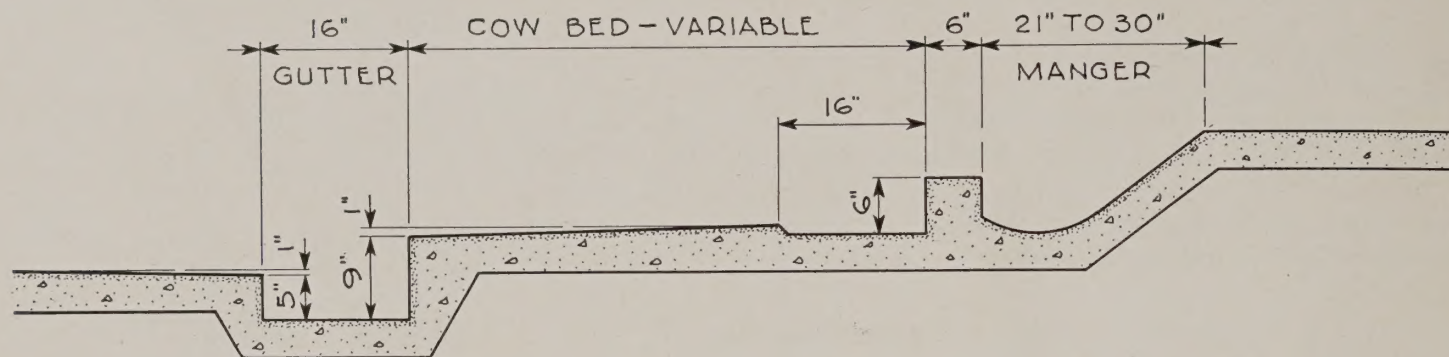
The layer of sheathing alone will not prevent this moisture from condensing on the walls.

So to dispose of excess moisture and excess heat some provision should be made to ventilate the stable. Ventilation not only disposes of excess moisture and helps to keep an even and comfortable temperature but it also gets rid of undesirable odors, disease germs and other air impurities.



Free Barn Inspection Service is Yours for the Asking. See Page 11.

How the Right Kind of Floor Prevents Accidents and Feed Waste



NOTHING counts like comfort in this business of keeping cows. A cow is a high strung animal. When she becomes chilled, restless, nervous, tired, or scared she doesn't milk as well as she might.

A cold clammy floor never makes a cow feel at home. If it is slippery it makes her nervous. A warm dry floor made entirely of concrete costs no more than any other good concrete floor.

A Warm Dry Floor That Costs No More, Means Greater Comfort and Profit

The building of this floor starts with the handling of the gravel or crushed rock. Coarse rock should be put down first and then on top of that the finer rock, or gravel. When this has been leveled off it should be covered with roofing paper, or other heavy water-proof paper before the concrete is poured.

What becomes of this layer of paper between the concrete and the base makes no difference. The only essential is that the paper lasts long enough for the concrete to set and harden. That gives you a solid slab of concrete resting on a base full of air spaces. This makes it impossible for moisture to work up through the ground below and cuts down the amount of body heat that is drawn away from the cow when she lies down.

On many jobs where Portland Cement comes in paper sacks, the sacks are split open lengthwise and laid over the base with two or three in. lap before the cement is poured, instead of the roofing paper mentioned above.

Proper Curb Saves Feed

The first part of a new concrete floor is usually the curb. A curb 6 in. wide and 6 in. high does very much to prevent the cow from working feed back under her foot. The surface should be troweled smooth and the edges rounded so the cow won't be injured from contact with them.

Starline Patented Taper Top Curb prevents bruised briskets and big knees.

The Manger Must Be Right

No manger was ever built wide enough or high enough to prevent a cow from nosing out hay or rough feed, although the use of a properly designed manger rail helps very materially.

However, the manger should be built wide enough to catch the grain and other concentrated feed that the cow spills while eating. It should be at least 21 in. wide—wider if you have the room to spare. Of equal importance with the width of the manger is the manner in which it is shaped. It should slope back so the feed will naturally slide to the lowest point in the manger, which is within a few inches of the curb. Here the cow can reach it easily and without straining.

Correct Manger Keeps Cows From Slipping and Straining

That's where the importance of the right kind of manger shows up most. Important as it is to save feed, it is still more important to have the feed within reach of the cow because most cases of big knees, sore shoulders and abscessed briskets are the result of cows slipping while straining for feed which they can see but cannot reach.

The manger should be finished with a heavy coat of rich concrete troweled smooth. This is not merely so the manger can be easily kept clean, but because many times cows go off their feed because of sore tongues, which come from working over the surface of a rough manger.

Starline Manger Divisions give each cow an individual feed box—prevent fast eaters getting too much and give the slow eaters their share.

Proper Cow Bed Aids Comfort and Cleanliness

The platform or cow bed should be made with the rear edge the same height as the front so the cow can stand with her feet at the same level.

About 16 in. back from the curb should be a rise of one inch and from this point the stall floor should slope back to the gutter.

This provides a depression 16 in. wide, which holds in place some of the fine bedding which the cows' hoofs chop up. This cushions her feet against the harshness of the bare concrete and keeps her from getting nervous and restless.

Roughened Surface Holds Bedding in Place

The surface of the cow bed should be floated—or scratched with a coarse broom just before it sets.

This is to keep the cow from slipping and to help hold the bedding in place.

The length of the cow bed should be made according to the average size of the cows in the herd. For small Jerseys, 4 ft. 4 in. from the curb back to the edge of the gutter is often enough, but for large Holsteins it may be necessary to make the cow bed anywhere from 4 ft. 10 in. to 5 ft. 2 in. from curb to gutter.

Cleanliness and Safety Depend Much on Shape and Size of Gutter

The gutter should be 9 or 10 in. deep on the side towards the cows. That gives you a gutter with plenty of capacity and keeps the cow up out of the way. It should be at least 16 in. wide, but there's no particular reason for making it any wider than that.

Where to Get the Money for Barn Improvements. See Page 11.

On the side of the cleaning alley or walk it should be only 4 or 5 in. deep. Then the cow can back out across the gutter without stumbling as she leaves the stall.

Where the gutter is 16 in. wide the cow won't attempt to step across it but will step down into the gutter and then up onto the platform as she enters the stall.

The gutter should be troweled smooth for easy cleaning.

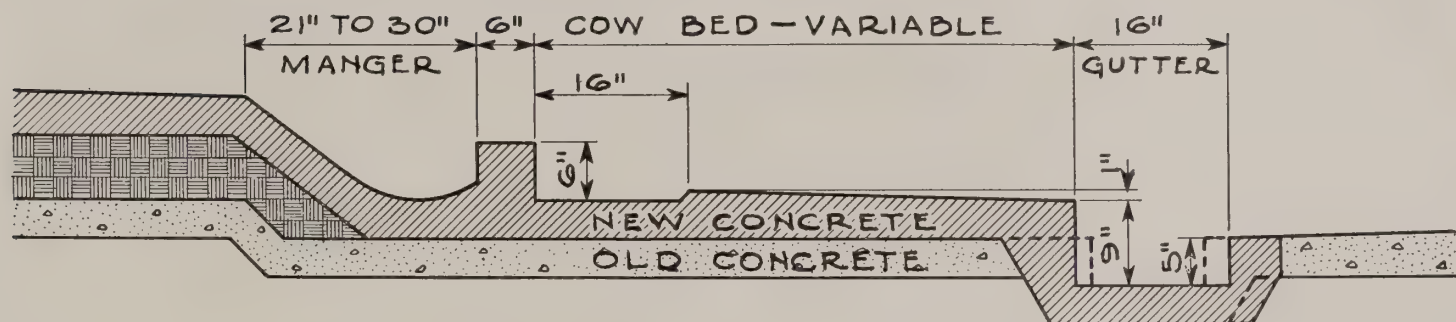
The cleaning alley should be float finished or marked up with a broom before it hardens so as to roughen the surface

because a smooth, slippery floor contributes to the nervousness that cuts down milk yield.

Starline Stalls Eliminate Crowding and Trampling—Prevent Costly Accidents

When the concrete floor is laid is the easiest and best time to put in modern stalls and stanchions with partitions separating the cows so that each cow has an individual place where she can stand up or lie down at will without danger and without fear of being crowded or trampled by her neighbors.

How to Turn a Costly Wasteful Old Floor Into a Profitable New One



IF you have a concrete floor where the dimensions vary materially from those mentioned above, there's no reason why the old floor should be broken up. Nearly always a satisfactory way can be figured out so that by laying more concrete on top of what you already have the floor can be made perfectly satisfactory.

In some of the first concrete floors that were laid in dairy barns the mangers were nothing but flat trenches. It's a simple and easy matter to set up forms necessary to make a manger of proper shape and width.

Shallow, Scanty Gutters Keep Cows Dirty

In the early days of concrete floors the gutter was usually about 4 in. deep and just the width of a shovel. For all practical purposes it might just as well not be there. Cows got dirty in spite of the gutter even though the barn might be cleaned two or three times a day.

Many farmers realizing that their gutters were far under capacity have tried to remedy the situation by knocking out the bottom of the gutter and digging it 6 or 8 in. deeper.

Now, that's a dangerous thing to do. Just imagine a cow trying to back across a trench only a foot wide and a foot deep.

The broken legs that result from stumbling are many and costly. It's much better to build the cow bed 6 in. higher with a new slab of concrete laid right over the old one and then raising the curb and manger to corresponding levels.

The additional width necessary for the gutter can be secured by chipping out from 4 to 6 in. on the rear side and still maintain the proper depth.

A New Gutter is the Easiest Way Out

However, this would leave the rear wall and a portion of the bottom of the gutter so rough that it could not be easily cleaned, so—in order to make a real job of it, it is better to chip back about 8 or 10 in. from the rear side of the old gutter,

knock out the bottom and rebuild the gutter as indicated in the illustration above.

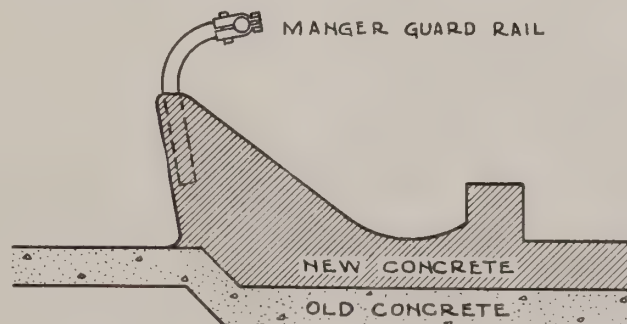
To Make the New Floor Cold-Proof and Moisture-Proof

Before laying the new slab of concrete over the old floor, the old floor should be thoroughly cleaned and mopped with a heavy coating of hot pitch. This destroys the capillary attraction or suction that brings up moisture from the ground below. It keeps the cow bed comfortably dry. It saves feed by preventing the body heat of the cow from being drained off through the floor when the cow lies down.

It is generally regarded as most convenient to have the feed alley at the same level as the top edge of the manger. Then it is a simple and easy matter to go along and push back into the manger the hay or other feed that has been nosed out.

Low Feed Alley Best With Low Ceiling

Where there is not sufficient head room for a high feed alley, the feed alley can be lowered to the level of the cow bed. In fact some prefer a low feed alley because what the cow pushes out, she cannot see and she won't be trying to reach it. Others regard a low feed alley as the only safe means of preventing the spread of diseases, whose germs are tracked around into the feed alley on the feet of those who work behind the cows.



Have a Practical Man Help You Check Up Your Barn at No Cost to You. See Page 11.

How Modern Equipment Pays In Any Barn

THE dividends on any sensible investment in good barn equipment are large and certain.

The saving in time, labor and feed and the decrease in production costs don't all come about in one day. But it must be remembered that barn equipment is on the job twenty-four hours a day the year round, making and holding your profits for you over a long and continuous period.

It doesn't sound like much to say that you get 10c worth more of milk from one cow the day after water bowls are installed, or that 10c worth of time is saved in a day by using a litter carrier in cleaning the barn where a small herd is kept.

Actual Cash Profits Continue Day After Day

A dime might also be the additional value of the milk that two or three cows would give in a day because wood lined swivel stanchions free them of the restlessness and nervousness that formerly cut in on their production. A dime might also be the value of the extra milk cows would give after installing salt cups for feeding salt and minerals.

A dime a day might be all you'd save in the depreciation of your barn structure after your barn is well ventilated.

But there are many savings which might be represented by a dime a day. And 10c a day amounts to \$36.50 a year. That would be pretty good interest on a \$500.00 investment. Yet such a simple and inexpensive device as a salt cup, costing less than \$1.50, placed before one cow in a Southern Wisconsin barn actually brought enough extra milk to pay better than 10c a day.

Expensive Accidents Headed Off

Years ago there might have been an excuse for cows trampling each other in crowded old barns, but today ruined udders and other expensive accidents are practically eliminated because a modern cow stall gives each cow an individual space.

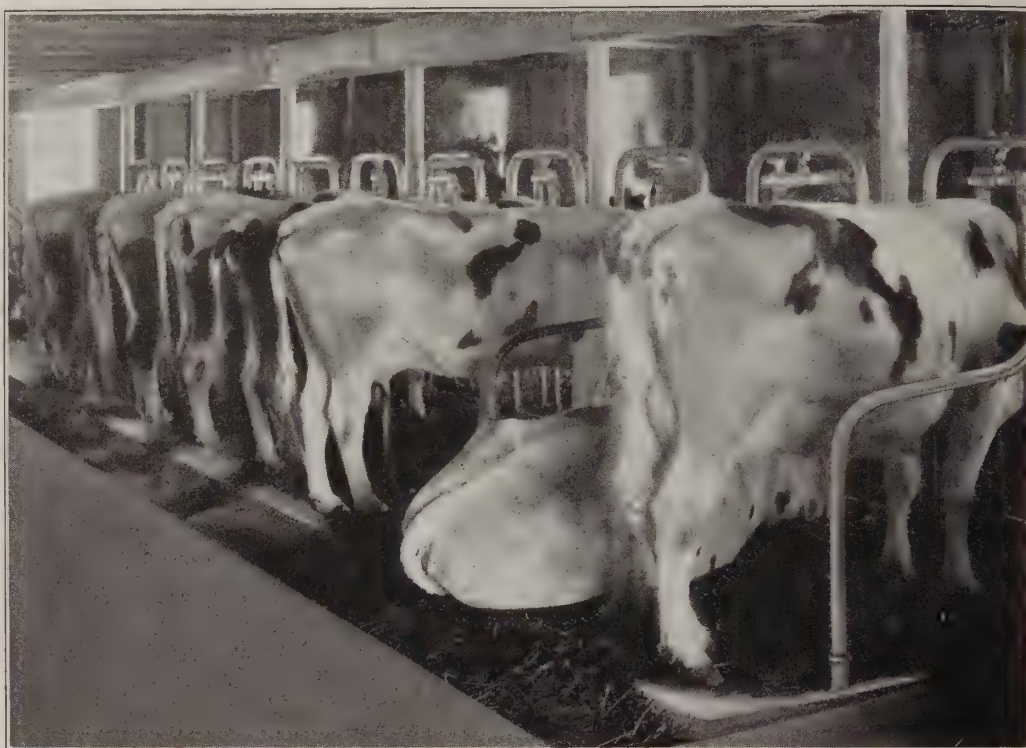
Loss Through Diseases Cut Down

Germ laden dirt that lies in the corners and crevices of old style wood construction is liable to make its presence felt at any time by inroads on the health of the herd, the cleanliness of the milk and financial loss.

Modern stalls and stanchions offer no chance for germs to hide. Being made of steel they're all surface—no checks, cracks, or crevices. They're easily cleaned and safely sterilized. They cut out damp dead-air pockets. They allow fresh air to circulate freely without drafts. They allow sunlight to penetrate the center of the barn and strike every spot where germs might propagate in dampness and the dark.

Safety and Comfort For the Cow Mean Profit For Her Owner

Any man who keeps even a few cows can profit by using modern equipment. No animal responds more quickly to good treatment than the cow. Securely held in a comfortable stanchion that keeps her safe, she can turn to look and lick behind. Protected from crowding and trampling by the partitions of a modern stall she lies down in safety, peace and



comfort and not in filth and fear. With fresh air and light reaching every spot around her, with fresh water before her, even at night, when she does most of her drinking—she's never nervous, restless or tired. She looks well, she feels well and she does well—always—for the man who realizes that in taking good care of his cows he's taking better care of his own profits.

Why Wait Until the New Barn is Built?

When a new barn is being planned, modern stalls, stanchions, pens, hay carriers, ventilating equipment are included as a matter of course.

But there's no reason why most of us should wait until the new barn is built, when the same kind of equipment can start working for us in the old barn right now.

If, later on, a new barn is built, this same good equipment can be transferred from the present structure to the new one.

Now, it may not be possible to get everything at once. After what farmers have gone through during the past few years we may have to go according to our means.

Why Not Get Started Now?

But if you can't get all you need at once, at least make a start in the direction of certain profits by getting what you're able to get—now.

Why, for example, should you go without the benefits of ten modern stalls that will keep ten of your cows safe, clean, comfortable and profitable—just because you can't get all of the stalls that your barn will hold?

Why not get the ten stalls now and add the others as you are able to do it?

You Can Start With a Little and Add As You Go Along

That's just the way hundreds are doing it. Maybe they just get a few stalls at first, adding the others later—then the necessary pens, water bowls, litter carrier and other equipment.

Convenient terms can be arranged with interest on deferred payments at the *ordinary bank rate* and *without any financing charge*.

How to Get the Money to Make Your Barn Right

WHERE is the money coming from?" is a perfectly natural question that will arise in the minds of many who know something ought to be done to make their barns profitable and who have definite, sensible and practical ideas as to just what should be done about it.

The old barn may have been losing money so long or so fast that it may be a problem to raise the modest amount required for materials even though home labor can do most of the actual work.

How a Smaller Herd May Mean a Larger Profit

So far as milk production is concerned, is there any difference between twenty-five cows producing 80% of what they should produce or twenty cows doing a 100% job?

The only reason the extra five cows are kept is because it takes five cows more to offset the handicaps of a faulty barn.

Increased Profits Without Increased Investment

Now, most of us make the mistake in figuring profits of basing them only on the investment in animals and feed, whereas they really should be figured on the combined investment in animals, *buildings* and feed.

Is there any good reason why some of these animals, the poor producers—those which are losing the most money for you—could not and should not be sold and that money used to improve the buildings, so that the balance of the herd would be able to produce at 100% efficiency even during cold winter weather?

It may be impractical to borrow money on land, but live stock is a liquid asset. It can always be sold for cash.

Turn Unprofitable Cows Into Profitable Barn Improvements

So it is possible, by selling off the most unprofitable animals, to get the money that will pay for temperature con-

trol and other barn corrections which will enable the remainder of the herd to produce at full capacity—and with profit.

By switching a portion of your investment in animals to an investment in buildings the total investment will remain just the same.

Assuming that 20% of the herd is sold, there would be a 20% saving in feed, a 20% saving in labor, the buildings would be increased in value, the fire hazard decreased and the animals would be healthier and better able to resist and ward off diseases.

You can't go wrong any time in selling cows that are actually losing money for you and by applying the proceeds to those improvements which will definitely and positively make the balance of your herd produce more profitably. Then you won't be ashamed to give an honest answer to the question, "Are your cows working for you, or are you working for them?"

Exchange Low Priced Cows For Lower Priced Materials

Cows may be cheap. But so is everything else. Check up carefully and you'll find that the proceeds from one cow will get you about as many sticks of lumber, bags of cement, or necessary pieces of equipment as they did at any time in the history of the world.

Get Extra Profits From The Better Investment

The sale of the unprofitable cows in the average herd will usually go a long way towards furnishing the cash that is necessary to make needed and profitable improvements. The extra profits that these improvements bring about can be counted on to add real money to your income for years to come.

Now Is the Best Time to Make Your Improvements

THE farmer who keeps cows has his time pretty well taken up seven days a week from early in the morning till late at night.

There's always plenty to do on a dairy farm, particularly where everything in the barn has to be done the hardest way.

There's no slack season, no particular time set aside for unusual jobs.

So one time is as good as another to do the many things

in connection with this important job of getting your barn fixed up right, except that the work of building or changing the concrete floor will have to be confined to the months when there's no danger of freezing.

Regardless of when the work is done, right now is the time to make your plans, so that when next winter comes you'll be in position to get by in good shape regardless of what price milk products are bringing and so that you'll get the full profit of the advance if conditions should get better.

Free Barn Inspection Service Is Yours For the Asking!

EVERY day in the year and sometimes far into the night Starline service men are devoting their time and attention to planning barns and checking up barns that are not making enough money for their owners.

These men have the benefit of the years and years experience of our Plan Department, which has helped thousands of deserving farmers get the best out of their barns through a careful study of plans, arrangement, construction and equipment.

Some of us are so close to our own problems and have become so used to getting along with things exactly

Wouldn't you like to have one of these service men who knows his business come in and check over your barn with you and just suggest things that might be done to insure a profit for you even when milk prices are low? " " " " " " "

as they are that it's hard to realize some of the things that the trained eye of an outsider with practical experience would spot in an instant.

One of these practical men will be very glad to help check up your barn with you and point out to you where you are losing money in your present barn or where you could make more money with a better arrangement. It won't cost you a cent and there's no obligation involved.

Just say "Send your man to help check up my barn" and we'll do the rest.

Make Your Barn Practical

A GOOD barn is a paying investment, and a modern barn providing comfort for the herd and convenience and profit for the owner can be so planned and constructed that it costs no more than a barn that serves merely to house the cattle.

Every extra dollar invested to provide convenience and economy in operation returns a better profit than any other part of your barn investment.

A barn should be conveniently arranged to save time and labor. It should provide a place for everything, in order that feeds may be stored, cattle properly housed and useless work and labor avoided.

It should also be sanitary—capable of producing clean, wholesome milk that will comply with rigid modern market regulations.

The barn should be correctly designed at the outset. Mistakes should be avoided not only in arrangement but in construction as well, so that the barn when completed will show up for every dollar that is invested in it.

The Location

In selecting a site for the Dairy Barn, care should be taken to choose a location where the yard will be well drained. It should not be necessary for cows to wallow through mud up to their knees to reach the barn. A cow

spends a large part of her time in the barnyard, and careful attention to the sanitary condition of the yard is necessary.

The selection of the site is very important. It is best that the barn should run north and south to get full benefit of the morning and afternoon sun. The barn so arranged will be warmer. Also plenty of sunlight will help to produce proper sanitation. Consideration should also be given to the position of the other necessary buildings. The location of the silos, the hog house, the granary, the pump house, dairy and tool house, with respect to the barn is very important.

All the farm buildings should be located conveniently with respect to each other, and having in mind their appearance as well. The appearance of the barn and adjacent buildings will add to or detract greatly from the value of the farm. A Dairyman is judged largely by his barn.

The Size

Be sure your barn is big enough. It is much more expensive to add to the barn than to make it large enough in the beginning. In determining the size, provide storage room to accommodate a bumper crop. Make it large enough to hold all the cattle your farm can profitably maintain. Experience has shown that the best barns are wide enough to accommodate two rows of cattle running lengthwise.

This type affords better ventilation and each row of cattle gets full benefit of the sunlight.

Preference is generally given to a rectangular barn 32 to 36 feet wide. This allows spacious feed alleys, stalls and gutters, and provides for a driveway through the barn, if desired. Stalls are regularly made in the following sizes: 3 ft.; 3 ft. 3 in., 3 ft. 4 in., and 3 ft. 6 in. The 3 ft. 6 in. stall gives ample room for any size animal. This is the preferred size as it is important to give each cow plenty of room.

While a one-story barn may be built as an ell or wing to the barn in which the fodder is kept, it is usually more economical to have the Dairy Barn two



STAR Equipped Barn at Fond du Lac County Farm, Fond du Lac, Wisconsin

stories high, providing hay and feed room directly over the cattle. The basement is warmer where there is a loft overhead.

The floor of the loft should be of double thickness, with heavy paper between. This prevents dust from sifting through. The same purpose can also be accomplished by sealing below the joists.

Another important advantage in a two-story barn is convenience in handling hay and in feeding. Chutes can be constructed above feed-ways, greatly increasing convenience in feeding. The chutes are closed when not in use.

The grinding room and grain bins can also be located on the mow floor and the grain spouted to feed room below. Placed in the mow the bins are readily accessible for filling and feeding and do not utilize the more valuable ground floor space. The two-story barn, in most cases, saves the dairyman the expense of building a separate granary.

The Design

Of utmost importance in either designing your new barn or bringing your present structure up-to-date, is to observe carefully the inspection requirements and the regulations of the market where the milk is to be sold.

In fact, where possible, it is well to anticipate new regulations and requirements that may be adopted a few years later.

There are various ideas with reference to the design of the barn. A type which will meet requirements in one locality or state may not in any way be adapted to another locality or state due to varying climatic conditions possibly, or else due to variation in the purpose. One farmer may have to consider his pocket book more than another. One farmer may be doing a different kind of dairying than another, or the materials obtainable in one locality may vary essentially from those obtainable in another.

Then, of course, the number of acres tilled and the corresponding amount of fodder raised, also the number of cattle to be housed and the corresponding extensiveness of the project, must all be taken into consideration.

In this book we have aimed to show a variety in design that will adapt itself to all the varying conditions enumerated.

Because market requirements may change or because a higher price may be offered by another market where requirements are more rigid, the safest procedure is to be sure that your barn complies with the inspection requirements of the most exacting market.

What is the most important thing about a barn?

Everything!

No detail should be neglected. But the place where the biggest waste is most likely to appear is in the arrangement of the floor.

To-day a great deal more thought is given to the arrangement of the farm and dairy barn than was formerly considered necessary. The modern barn plan calls for an arrangement which will provide for the many devices intended to reduce labor and improve living conditions of the livestock. Walks, alleys and doors must be laid out in relation to the carrier system and the other farm buildings.

Supposing a little change in the plan would save you fifty steps three times a day. That would figure to over ten miles a year. Ten miles isn't much of a walk, but many barns have a dozen or even more ten-mile walks built right into them. Think that over. Then do some careful thinking about the floor arrangement.



Barn of Springfield Dairy Products Co., Springfield, Ohio.

Designed, Planned and Equipped Throughout With STAR Stalls, Stanchions, Water Bowls, Manger Divisions, Litter Carriers and STAR Syphon Ventilation.



The Floor Plan

SOME advocate facing the cows in, others advocate facing them out.

Both methods of arrangement have supporters—men of judgment and prominence in the Dairy World.

Usually a prospective builder has made his decision relative to this matter before other details have been considered.

We've endeavored to present the arguments here with pro and con for the two arrangements. This is a subject on which we're neutral. We can see distinct advantages in both—compensations in one that are offset by compensations in the other. This leaves but little choice.

Where Cows Face In

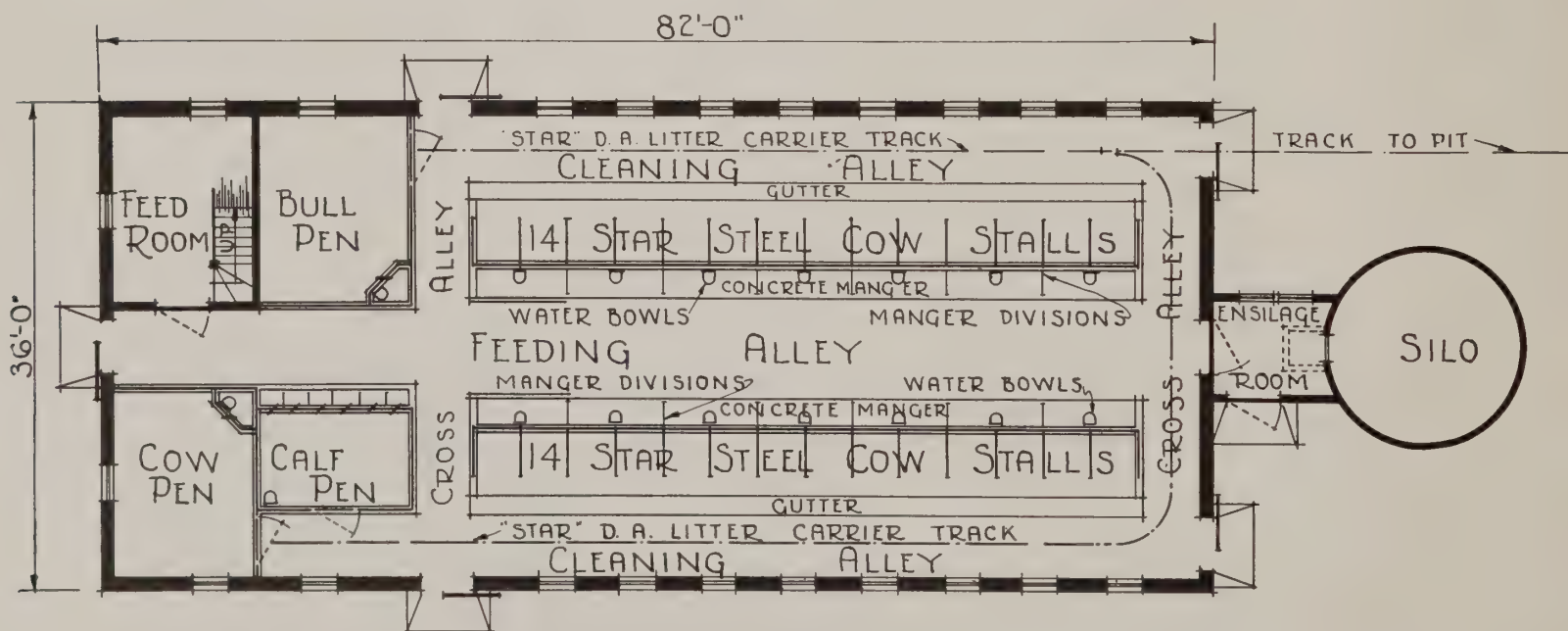
This arrangement of the barn has a number of advantages. You can take

the feed all down a center alley and distribute it right and left as you go along. It centralizes the work of feeding. Then the herd is divided so you don't have all the cows trying to crowd through one door at the same time.

The out-take chutes for ventilation are located at the sides of the barn where they are out of the way, and do not occupy space which could well be used for other purposes.

Sunlight strikes the gutters and litter alleys directly. It gives you light behind the cows when milking in the morning and at night.

Another advantage of this arrangement is that some prefer to see all the herd from either end of the feed alley.



• GROUND FLOOR PLAN



Where Cows Face Out

Advocates of facing the cows out call attention to the fact that while it may be well to do your feeding from one alley, you nevertheless do three-fourths of the work *behind* the cows. Cleaning and milking take more time than feeding.

They claim that the cows breathe better air when they face out than when they face in.

That it's more important to have the sunlight applied to the manger where the cow is fed than to the gutter behind her.

That you've got to build long intake chutes for ventilation if your cows face in.

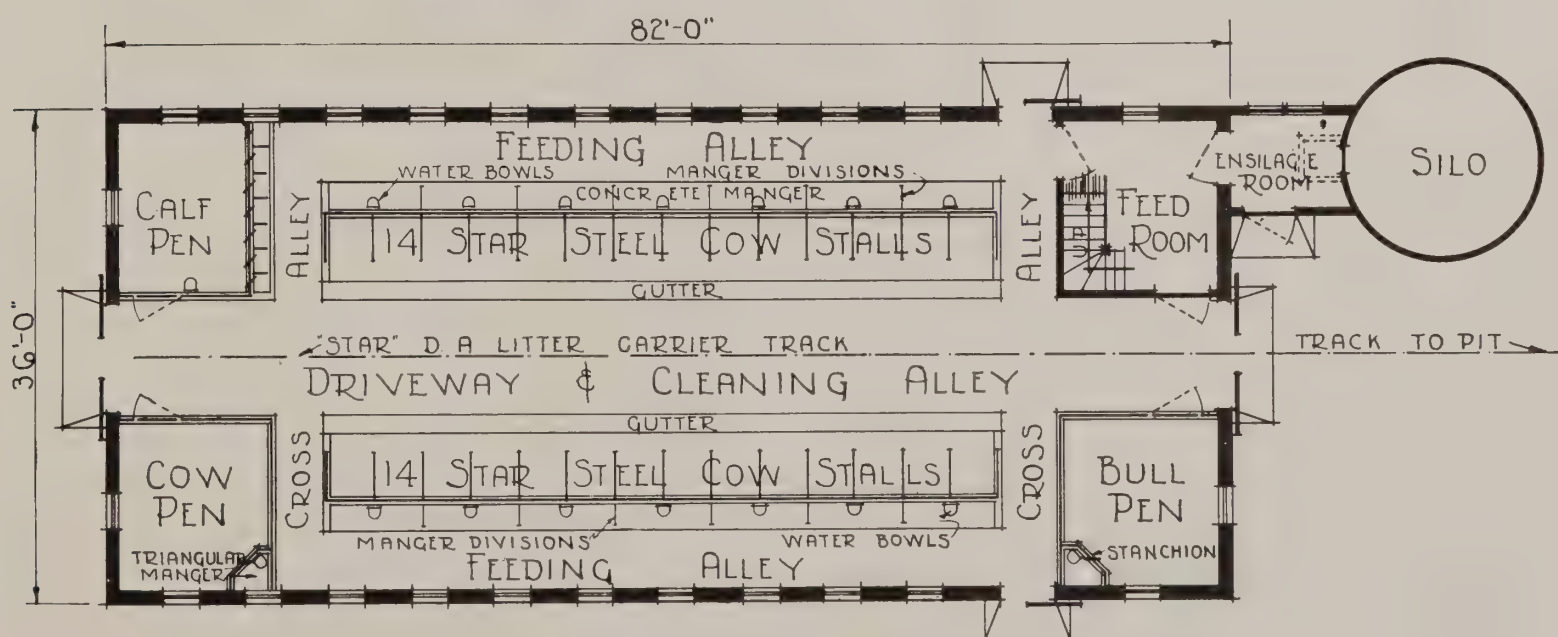
That you've got to divide your herd to get it into the barn and if you

get a cow on the wrong side of the barn, it causes confusion.

Where cows face out the supporting posts for hay loft floor can be placed where they will in no way interfere with the arrangement of the stalls.

Then the appearance of both herd and barn is better where cows face out. Cows are always sized up from behind. Where they face out, the whole herd is seen at one time.

Furthermore, there never was a barn built, where the cows faced the center, that was wide enough to prevent the walls becoming spattered with manure. Facing the cows out prevents this. It keeps all the manure along one alley and the gases and fumes are more easily disposed of when they are in one place.



• GROUND FLOOR PLAN •

Construction Details

The Foundation

THE foundation of a barn should be built with the same care as that of any other building. The bottom of the foundation wall should be at least six inches below the frost line. It should go down to hard pan to minimize settling of the building. The base or footing should be at least two feet wide for a two-story structure. It should be made of concrete, 10 or 12 in. thick.

The foundation wall should be carried high enough so that the sills are protected from rotting. We recommend that the wall be run no higher than the bottom of the windows and

that it, as well as the ground floor, should be made of concrete.

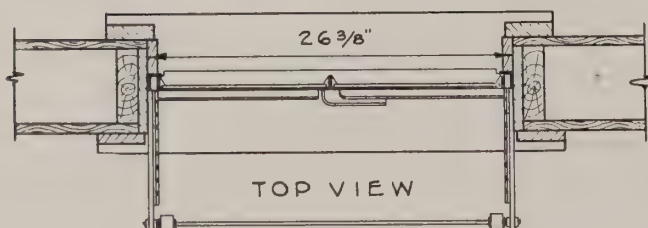
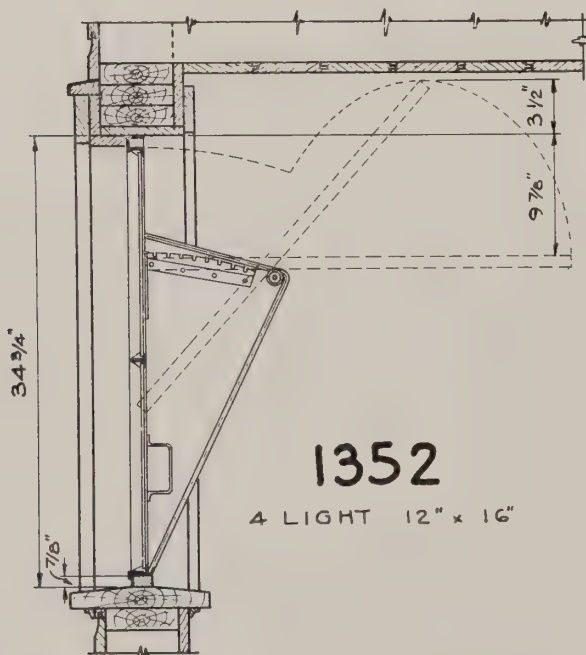
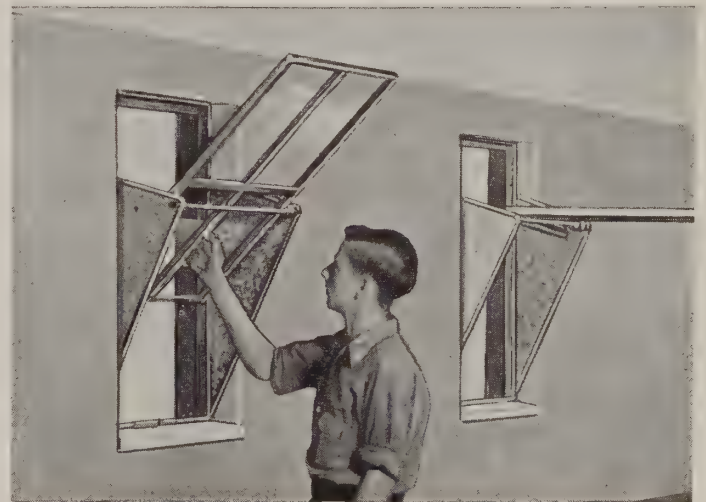
For a simple, solid wall of concrete, forms are made of matched sheathing with the smooth side in. These are supported by 2 in. x 4 in. studs set 24 in. apart on center. A section of wall 3 or 4 ft. high can be made at one time, but the greatest care should be used to see that the forms are absolutely plumb and thoroughly braced. Bolts about $\frac{5}{8}$ in. x 16 in. should be inserted in the top of the wall at intervals of 6 ft. The threaded ends should stick up about 5 in. above the wall. These are used to anchor the sills.

Starline Roll-up Steel Windows

Make Any Good Barn Better

PLENTY of windows assure an abundance of sunlight. They should provide at least $3\frac{1}{2}$ square feet of glass per cow (four square feet required where certified milk is produced).

Windows should be evenly distributed, and where they are exposed to bleak winds storm sash can be profitably used.



For many years, single sash have been universally recommended and used. They open in at the top. When the windows are protected with wings at the side, the cold incoming air becomes diffused and mixed with the temperate air in the stable, thereby preventing drafts.

Starline Roll-Up Steel Windows offer this very essential advantage.

Being all steel, they do not swell and stick like wood sash. They roll up and down easily, seal tightly when closed, and lock safely in every open position.

The illustrations at the left show the four-light 12 x 16 window, including measurements by which it is easily installed. Other sizes illustrated and fully described on pages 60 and 61.

The Floor Must Be Warm and Dry

THE warm dry floor is important because it keeps the cow from becoming chilled and restless. It relieves her of that nervousness which a cow always gets from a cold, clammy, slippery floor.

Here is a practical way to insure a warm dry floor. The dirt filling should be covered with coarse rock or gravel and then finer rock or gravel placed on top of that. When this has been leveled off it should be covered with roofing paper or other heavy water-proof paper before the concrete is poured. This provides a solid slab of concrete resting on a base that is full of air spaces. This prevents moisture from working up from the ground below and it cuts down the amount of body heat that is drawn away from the cow as she lies down.

The concrete is 4 in. thick and is mixed in the proportion of one part cement, two parts sand and three parts gravel. Enough water is added to make it of a quaky consistency so that when

struck with a straight edge a small amount of water will appear on the surface.

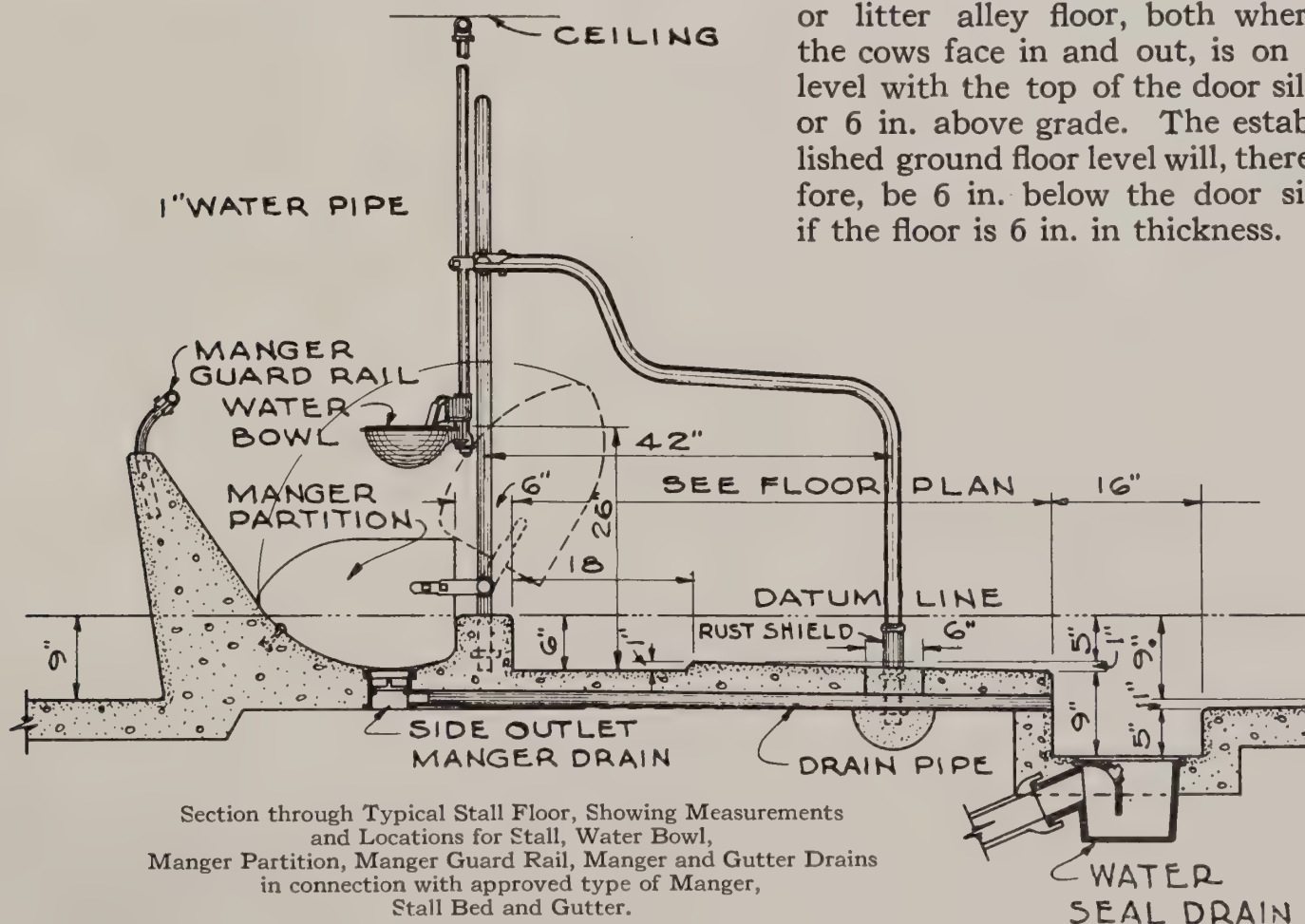
A floor laid according to this method will not wear slippery.

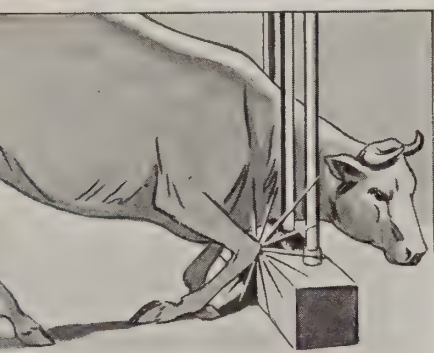
To get the best results, freshly laid concrete should be protected from extremes of temperature. A wet straw covering during the hot weather prevents a too rapid hardening, but it should not be put on until the surface of the work has set somewhat.

In freezing weather, fresh concrete should be covered with straw just after it begins to set and this covering should be left on for at least thirty-six hours.

Floor Level

It is important to get the right floor level. The dirt should be levelled off, cutting it down where too high, and filling in where too low, wetting and tamping until a hard surface is obtained. It should be noted that the cleaning, or litter alley floor, both where the cows face in and out, is on a level with the top of the door sill, or 6 in. above grade. The established ground floor level will, therefore, be 6 in. below the door sill if the floor is 6 in. in thickness.





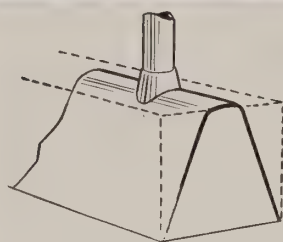
Above illustration made from slow motion picture shows how a cow bumps her knee on the edge of a square curb as she lies down.



When a cow lies down she goes down front end first. Before she does that, she shoves forward as far as possible to keep her head from being jerked back into the stanchion when she drops down behind. Then she lets herself down onto one knee. With the taper top curb her knee may graze the slanting side of the curb as she goes down but it cannot run into a sharp edge.

or bruised. She gets up with the same ease and freedom.

The danger of bruised knees and briskets which sometimes become abscessed or infected is eliminated by Starline patented Taper Top Curb.



STARLINE Taper Top Curb is more sanitary. Its rounded top offers practically no flat surface where dust and dirt can lodge.

Taper Top Curb Prevents Bruised Briskets and Big Knees

This latest and most important contribution to the comfort and safety of the cows and the satisfaction and profit of those who keep them is available without cost to each purchaser of Starline stalls and stanchions.

With the Starline Taper Top Curb, the cow can let herself down to her front knees without danger of being bumped

Square Top Curb Permits Use of Starline Curb Clamps

Whether the taper top curb or square top curb is used, the curb is the first part of the floor to be built. It should be six inches high. A square top curb should be six inches wide.

Where Starline Curb Clamps are used (with square top curb only), all of the concrete work can be done before the cow stalls are put in place.

Where Starline Curb Clamps are not used, stalls should be assembled, set up, and held in place by the steel templates (shipped with stalls) nailed to curb form boards.

Drainage Grades

The litter and cleaning alleys should have a slight pitch toward the gutter.

Where a high feed alley floor is used the floor should pitch toward the manger.

There should also be a certain amount of slope in the length of manger and gutter.

These pitches in most cases being slight, the variation in grade can be made in the level of the dirt floor or by varying the thickness of the concrete floor.

After the levels have been established, the drain tile can be laid and the drains and traps set at correct heights.

The main floor level having thus been determined, the levels of the gutter floor, stall bed, manger and feeding floor can be easily obtained, being indicated by the use of sticks or by marking the walls.

Cow Bed

After the manger, the cow bed or platform is put in.

This should be about 4 ft. 6 in. long for Jerseys. Guernseys and Ayershires should have 4 ft. 8 in. to 4 ft. 10 in. For Holsteins and Durhams use 4 ft. 10 in. to 5 ft. 2 in.

Eighteen inches back of the curb, an elevation of $\frac{3}{4}$ in. should be put in to hold the bedding in place and provide a foothold for the cow when rising.

From this point the cow bed should slope toward the gutter gradually $\frac{1}{4}$ in. to the foot. This provides for drainage and permits the cow to stand with front and hind feet on the same level.

The surface of the cow bed should be brushed with a broom before drying, in order to give the animals a safe footing.

The level of the cow bed should be at least 3 in. above the level of the litter alley.

Manger

The manger is constructed next.

With a manger brought up higher than the level of the feed alley as shown here, all the alley-ways throughout the barn can be kept on the same level so that there will be no inclines to overcome. This high manger or low feed alley is insisted upon in certain sections of the country as being more sanitary, because there is less likelihood of putting into the manger disease germs that are tracked around from behind affected cows.

Great care should be exercised in finishing the manger. It should be finished with a coat of sand and cement at least an inch thick. This is recommended to prevent the manger being worn down to a point where it exposes some of the larger stones in the coarse concrete.

In many old barns where this precaution was not observed, exposed rough stones in an old manger have made cows' tongues sore and they have gone off their feed because of sore tongues.

STARLINE Steel Manger Forms Adjustable to Any Practical Manger Width

Made of Heavy T-Bar bent to proper shape with adjustable top catch that locks into proper notches for mangers of the desired width.

STARLINE Steel Manger Forms are used for forming the high mangers as illustrated. The manger should be 21 in. to 30 in. wide and should have a proper slope to drain. This width is needed so that the feed will not be scattered and wasted. When

STARLINE Steel Manger Forms Give Your Manger the Proper Shape



Straight edge being used with pair of STARLINE Manger Forms to shape manger.



STARLINE Manger Form used as a guide for floating surface of manger.

the cow eats, she takes a mouthful and extends her nose straight out in front. The distance from the stanchion to the end of the nose is from two to two and one-half feet. Therefore, a manger wide enough to catch the scattered feed is necessary.

The sloping concrete manger keeps the feed within reach at all times.



This is an important point, for when cows reach too far they are liable to slip, thus causing big knees, various sprains and bruises.

The surface of the manger should be finished with a steel trowel and made as smooth as possible.

Gutter

The gutter should be 8 in. to 10 in. deep on the side of the cow bed, and 16 in. to 20 in. wide. Constructed in this manner, the gutter is wide and deep enough to accommodate the manure and keep the cows clean. On the side of the alleyway, the gutter should be about 3 in. to 5 in. deep so the cow can easily back out of the stall.

The bottom of the gutter is sometimes pitched $\frac{1}{2}$ in. from the stall side to the alley side so that the liquids will run to the back of the gutter. It should be trowel-finished in order that it may be easily cleaned. It should be sloped to a drain so that it can be flushed when necessary.

Feed Alley and Cleaning Alley

The balance of the floor is devoted to the feeding alleys and the cleaning alleys. The width of the feeding alley and the level above the ground floor will be determined by the type of manger used.

The proper height of the feed alley floor, where the floor is brought to the level of the top of the manger, should be determined before pouring concrete.

The bottom of the manger and cow bed are on a level. The feed alley is, therefore, equally high above both. The amount of room left is devoted to the cleaning alley, which should be brushed with a broom before the concrete has set in order to give it a rough finish.

The importance of making the barn

wide enough will be seen at once because anything taken from the width comes out of the alleys and a narrow alley is an inconvenient place in which to work.

The Drains

Every part of the concrete floor, as well as mangers and gutters, should be provided with a means of drainage so that they can be flushed with water and thoroughly drained.

Care should be taken, however, that the walks and alleys are nearly level so that there will be no danger of the cow slipping.

Posts or Columns

In planning the inside arrangement of the barn, one of the most important matters to consider is the arrangement of the posts or columns. These should be located in the curb between the stalls and in line with them where the cows face in, and they should be placed back of the stall partitions where the cows face out.

Steel columns are preferable to wood posts because they occupy less space, are stronger and are more durable—also, because they offer less obstruction to the light and are not subject to decay. They are more sanitary.



STAR Equipped Walworth County Dairy Barn, Elkhorn, Wis.



The Starline Trussed Roof Barn

THE plank frame construction has taken the place of the old style timber frame construction for the following reasons:

1. It is stronger.
2. It is cheaper.
3. It is easier to build.
4. It provides more loft room.

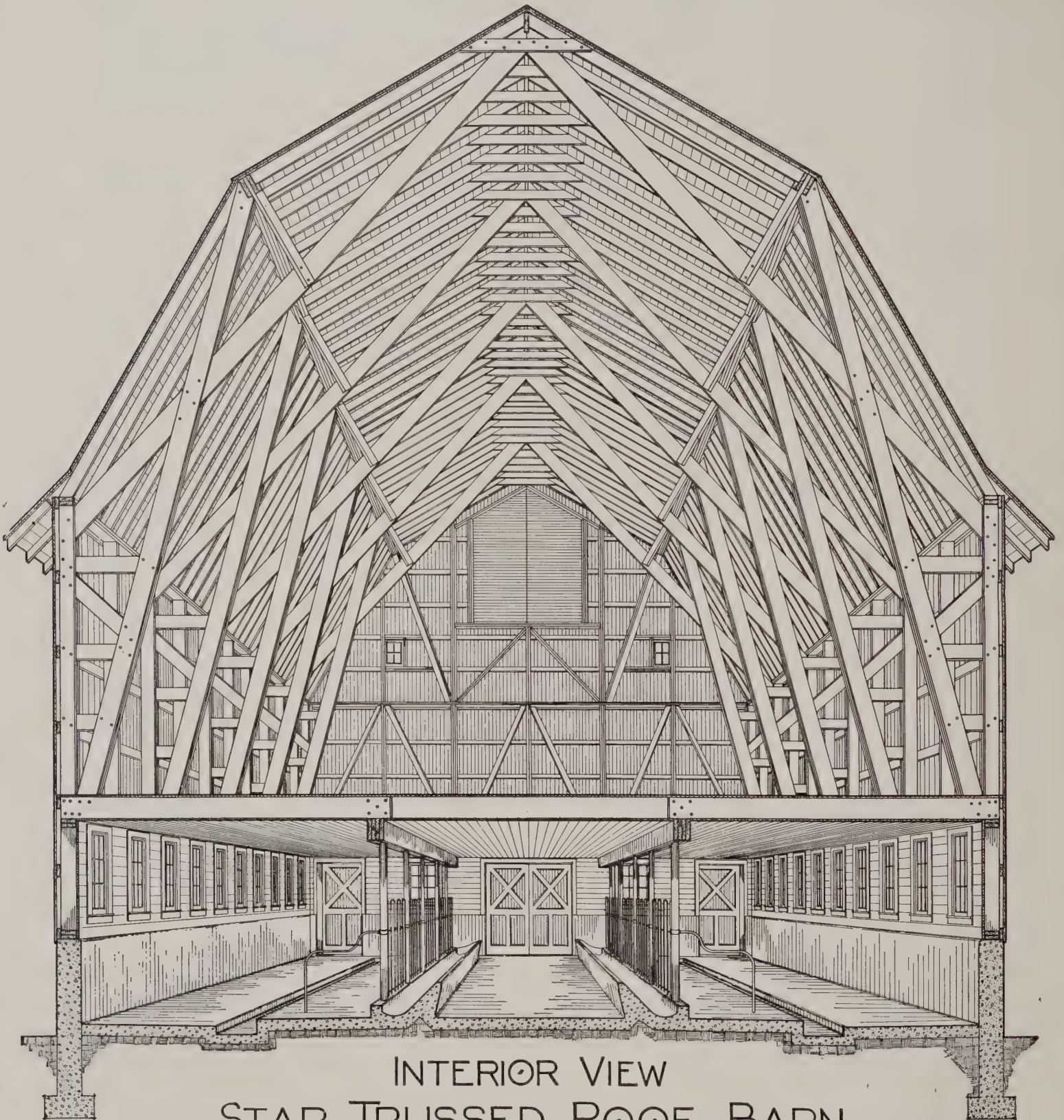
The timber frame construction depends for its strength on careful work in making the joints and on the heft of material used. A timber frame is no stronger than its weakest tenon. The plank frame is heavily braced. It is made up of several trusses. These trusses are placed at intervals lengthwise of the barn ranging from 10 to 14 ft. apart, depending on the height of the building. The plank frame is so trussed and knit together that the strength of every fiber is brought into use. Heavy

timbers are scarce and consequently expensive. In the plank frame construction, nothing heavier than 2 in. planks are used.

In erecting a plank frame barn, no scaffolding is required. When the first truss is completed, it serves as a pattern for the others which are made exactly like it. It is an easy matter to erect the trusses, this being accomplished either with a small gang of men or a horse and tackle.

The plank frame construction makes easy the putting away of the hay in the mow with the hay carrier as there are no crossed beams or heavy supporting timbers in the way. Therefore, requires less help to put away the hay and it can be done in much less time—which is an important factor in hay making.

This construction also provides for much more storage space in the loft.

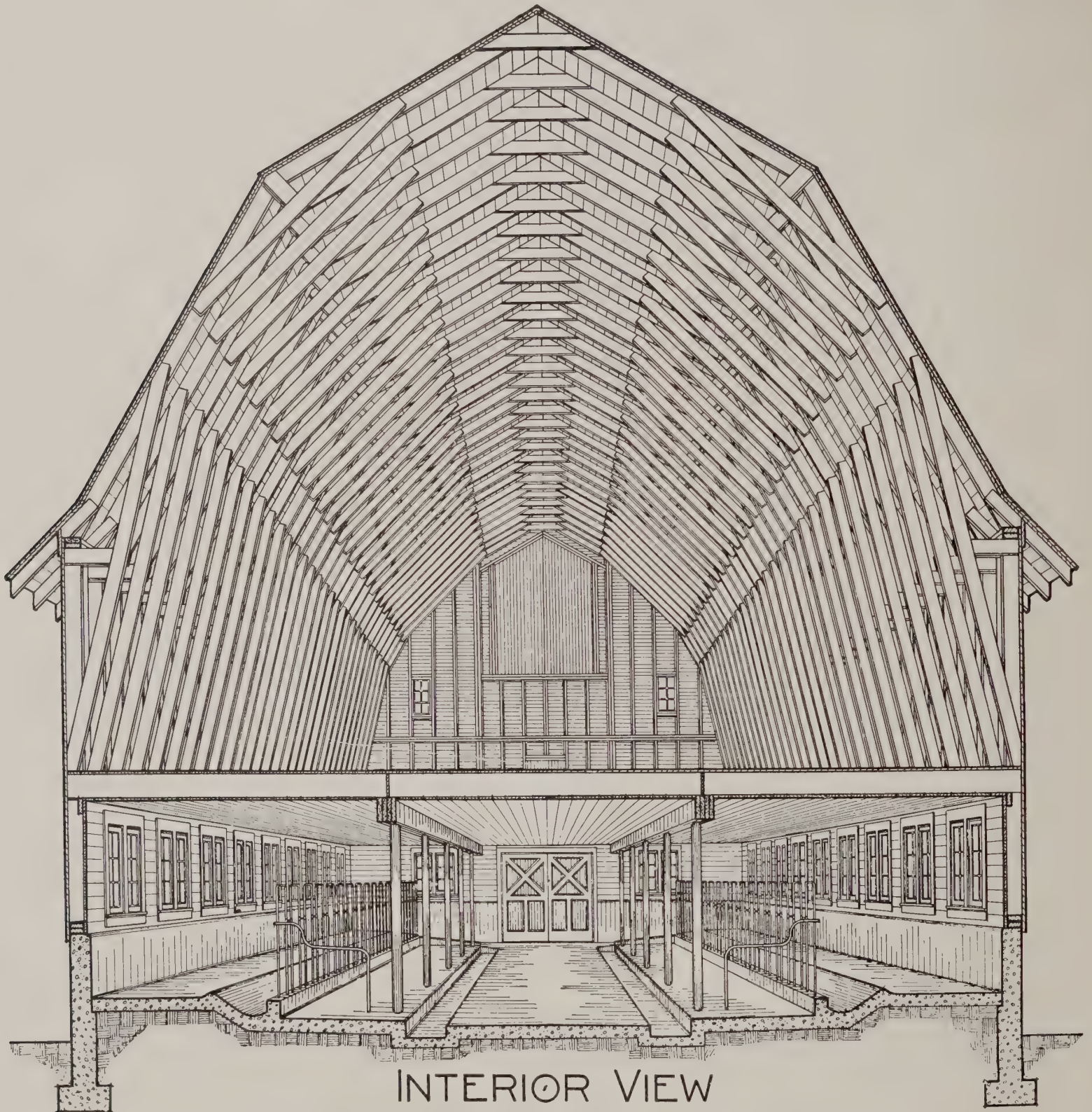


INTERIOR VIEW STAR TRUSSED ROOF BARN

Blue Prints of cross section and stock details for Truss Roof Barns thirty to forty feet wide furnished free on request to those who intend to build. Be sure to mention width.



After the first two trusses are raised the two upper plates, and the two lower plates are put in. Then the side framing, including the girts around the building, are installed (side framing shown in detail on a previous page). When all the trusses are up and braced as shown by the details on the following pages, the two purlins are hoisted to position by block and tackle, and the ridge pole is added. The rafters, look-outs, and rafter ends are the finishing touches to the frame.



INTERIOR VIEW
STAR BRACED RAFTER BARN

Blue Prints of cross section and stock details for Star Braced Rafter Barns thirty to forty feet wide furnished free on request to those who intend to build. Be sure to mention width.

Star Braced Rafter Barn

WE submit on the opposite page another type of barn construction—the Star Plank Frame Braced Rafter Barn—a popular type of construction for barns not exceeding forty feet in width. This type is preferable where it is not necessary to drive into the mow floor for threshing or for grain storage.

An advantage of this type of construction is that only short lengths of lumber are needed. It is the most economical because it requires the least amount of lumber per given capacity, that it requires no timber larger than will be found in stock in the average lumber yard, which saves time in ordering special sizes. No timber going into this frame is over twelve inches wide, and sixteen feet in length. A mechanic is not required to frame this barn, as there are few difficult joints to make—a feature that will be appreciated by the farmer who is his own carpenter.

With this type of construction the roof arches transfer the roof weight uniformly on all the studding, a uniform load is carried on the foundation wall. This also prevents the roof from sagging as often occurs with barns having a light roof supported by heavy trusses spaced some distance apart.

The concrete wall extends far enough above floor and grade to prevent moisture from coming in contact with the wood sill of the frame. The sill is built of 2 thicknesses of 2x6-inch lumber bolted to the concrete wall by means of anchor bolts. The studding are 2x6-inch and spaced 16 inches or 24 inches on center. The 24-inch spacing is preferred because any stock length of boards may be used and can be nailed to studding without waste. The length of studding will depend upon how much space will be required for hay storage. The rafter plate con-

sists of two thicknesses of 2x6-inch spiked on top of studs. The floor joists of the hay mow floor are made of 2x10 or 2x12-inch joist, as the weight may require, and are spaced the same distance apart as the studding so that the outer ends of joists may be spiked against the side of studs and at same time rest on a 2x4-inch ribbon or ledger which is notched 1-inch into the studding and continues the entire length of both side walls. The girder is built of 4 or 5 pieces of 2x10 or 2x12-inch lumber with joints broken, well spiked and bolted every 2 feet. These girders are supported either by wooden or steel columns, the steel columns are preferable.

The roof rafters are 2x6-inch and consist of lower and upper rafter spaced 24 inches on center, the lower rafter sets on the plate directly above stud, each set of rafters are braced with 2x6-inch braces and at ridge with a 2x6-inch collar beam.

In framing the roof one set of rafters is first carefully laid out on the mow floor or other level place, and after the exact length of each piece is computed, these are used as patterns to which all other pieces are cut.

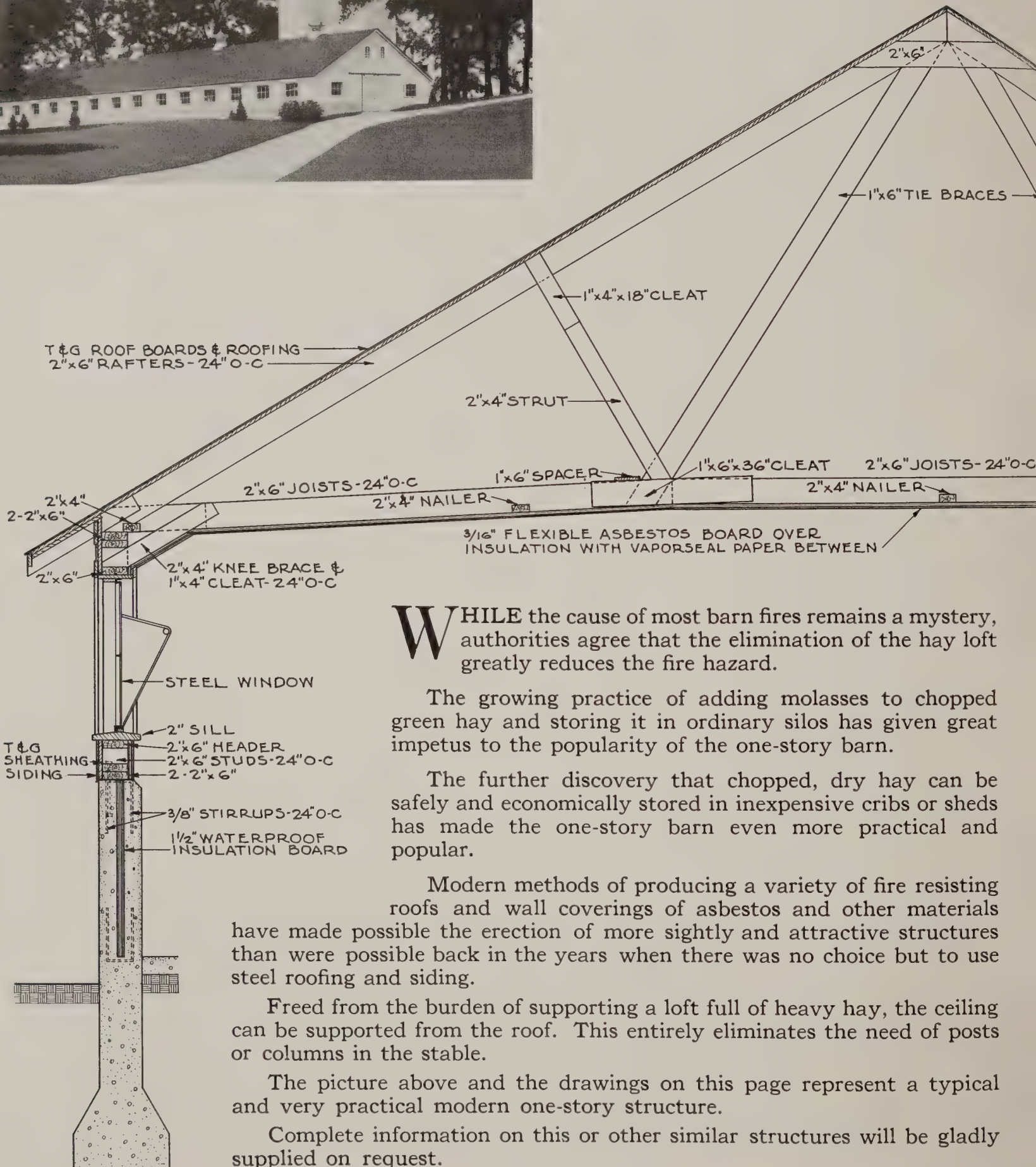
In the use of this type of construction, no posts are required in the hay mow to support the peak of the roof as the roof is self-supporting. For this reason, the largest amount of storage space is provided in the mow and there are no obstructions to hinder in the unloading of hay by means of hay carriers and track.



Star Equipped Barn of Mr. Horace Sears, Weston, Mass.



STARLINE ONE-STORY STABLE



WHILE the cause of most barn fires remains a mystery, authorities agree that the elimination of the hay loft greatly reduces the fire hazard.

The growing practice of adding molasses to chopped green hay and storing it in ordinary silos has given great impetus to the popularity of the one-story barn.

The further discovery that chopped, dry hay can be safely and economically stored in inexpensive cribs or sheds has made the one-story barn even more practical and popular.

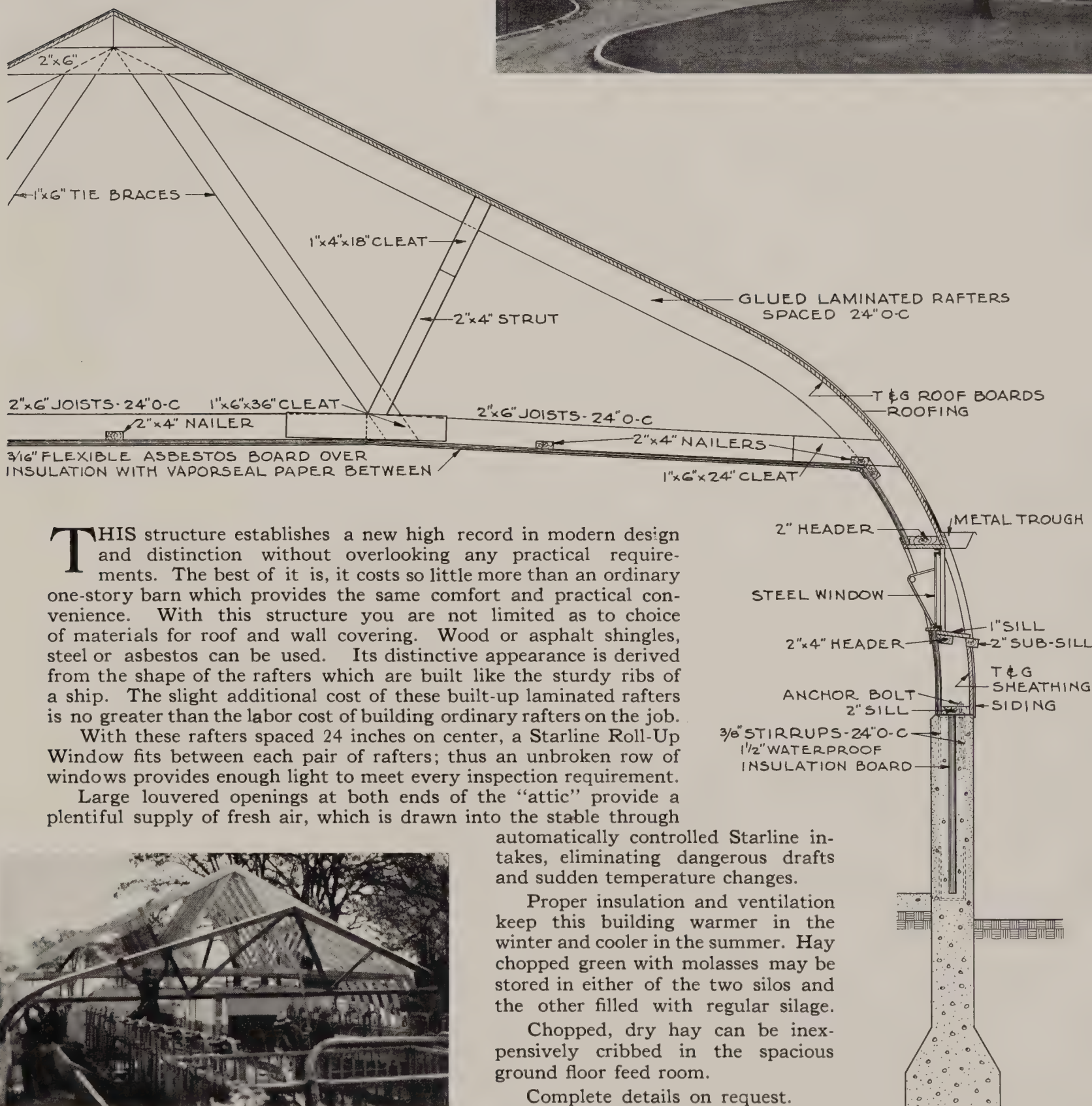
Modern methods of producing a variety of fire resisting roofs and wall coverings of asbestos and other materials have made possible the erection of more sightly and attractive structures than were possible back in the years when there was no choice but to use steel roofing and siding.

Freed from the burden of supporting a loft full of heavy hay, the ceiling can be supported from the roof. This entirely eliminates the need of posts or columns in the stable.

The picture above and the drawings on this page represent a typical and very practical modern one-story structure.

Complete information on this or other similar structures will be gladly supplied on request.

STREAMLINED STARSTRUCTURE



THIS structure establishes a new high record in modern design and distinction without overlooking any practical requirements. The best of it is, it costs so little more than an ordinary one-story barn which provides the same comfort and practical convenience. With this structure you are not limited as to choice of materials for roof and wall covering. Wood or asphalt shingles, steel or asbestos can be used. Its distinctive appearance is derived from the shape of the rafters which are built like the sturdy ribs of a ship. The slight additional cost of these built-up laminated rafters is no greater than the labor cost of building ordinary rafters on the job.

With these rafters spaced 24 inches on center, a Starline Roll-Up Window fits between each pair of rafters; thus an unbroken row of windows provides enough light to meet every inspection requirement.

Large louvered openings at both ends of the "attic" provide a plentiful supply of fresh air, which is drawn into the stable through

automatically controlled Starline intakes, eliminating dangerous drafts and sudden temperature changes.

Proper insulation and ventilation keep this building warmer in the winter and cooler in the summer. Hay chopped green with molasses may be stored in either of the two silos and the other filled with regular silage.

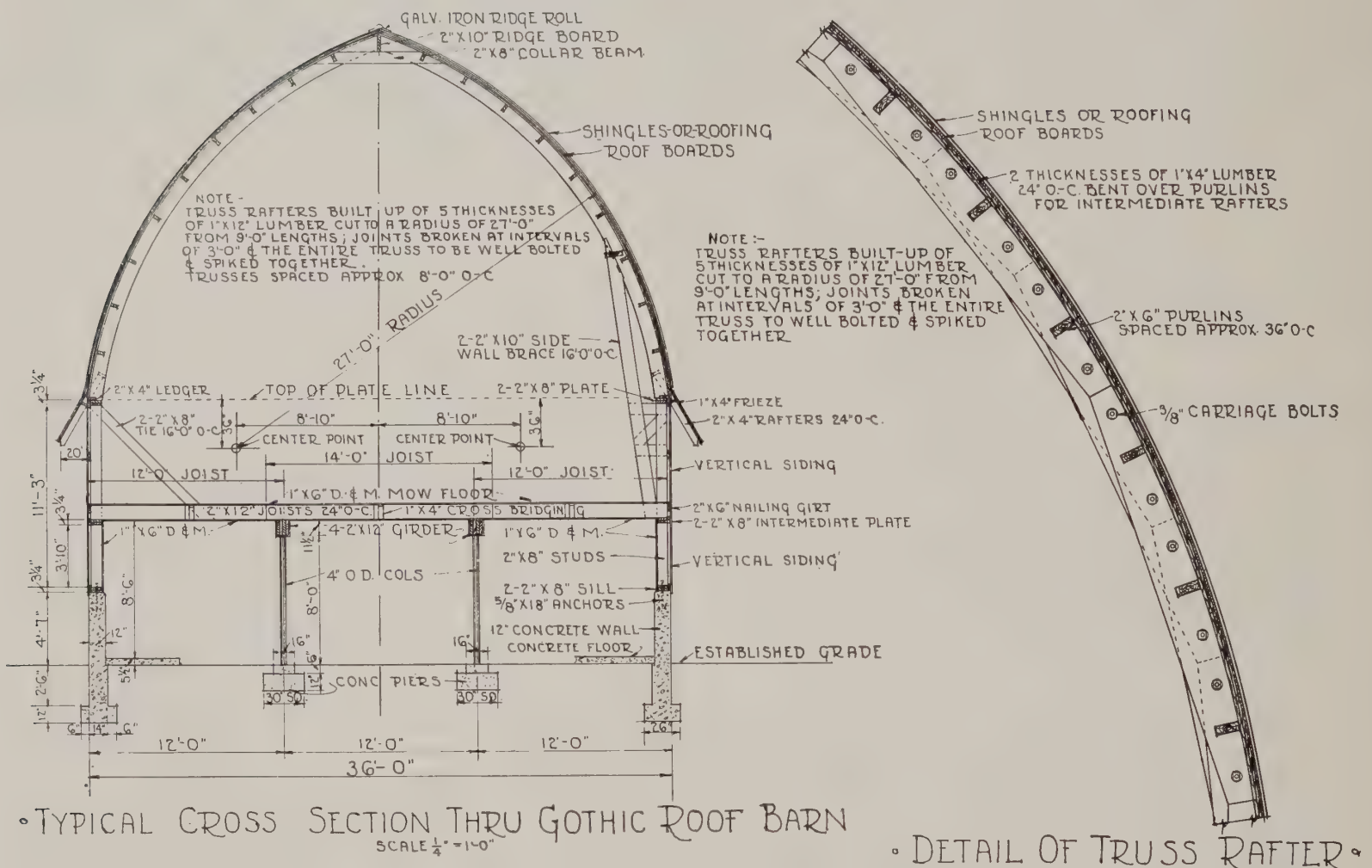
Chopped, dry hay can be inexpensively cribbed in the spacious ground floor feed room.

Complete details on request.





Star Gothic Roof Barn



STAR Gothic roof construction offers the same economies over the old style timber frame as does the Star Plank Truss roof illustrated and described on the preceding pages. Its attractiveness has made it quite popular and well liked from the standpoint of appearance. When the Gothic Roof is properly proportioned, it makes an unusually graceful building. It is a roof which can be used on barns of practically any width.

The secret of the strength of a Star Gothic roof is the heavy built-up rafters which come every eight feet. These are built-up of inch boards nailed and bolted. A practical way to build them is to strike off on the floor of the loft the arc of the circle according to which the roof is to be shaped. Set a 1" x 4" on edge along this mark and nail it into place. The different members of the truss,

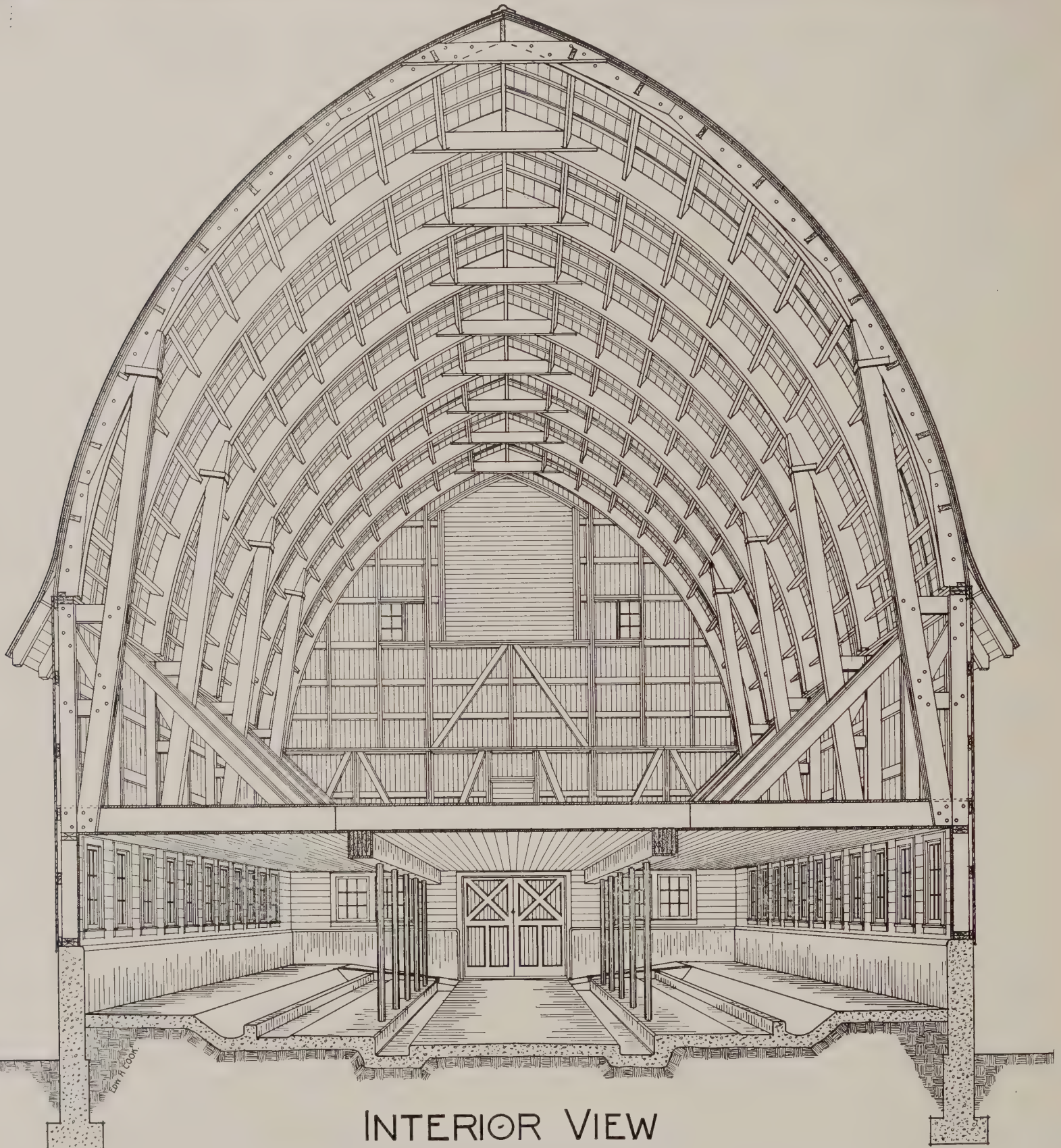
as shown in the illustration above, are sawed out of 1" x 12" lumber nine feet long.

They are laid with broken joints shoved up snug against the 1" x 4" just mentioned and well nailed. Five layers of boards are used and $\frac{3}{8}$ inch by 4 $\frac{1}{2}$ inch bolts are placed about two feet apart, being sure to have one close to each side of every joint. These principal rafters can be raised one at a time, being toe-nailed at the top to the ridge board and temporarily braced.

A 2" x 10" x 20' plank can be used across each truss as a part of the temporary bracing and allowed to remain in place for convenience until the hay track is hung.

These rafters may be raised by use of a scaffold set up on the loft floor or in pairs by means of a block and tackle.

After the rafters are up, the 2" x 6" purlins spaced approximately three feet apart, are nailed in place starting at the plate and working upward. The purlins are followed by the intermediate rafters which are built up



INTERIOR VIEW STAR GOTHIC ROOF BARN

Blue Prints of cross section and details for Gothic Roof Barn thirty to forty feet wide furnished free on request to those who intend to build. Be sure to mention width.

Have Your Barn Built on Paper First

Let STARLINE Help to Plan Your Barn
and Equip It Complete

FOR more than fifty years, ideas about barn construction, arrangement and equipment have been coming in to Starline headquarters.

These ideas are gathered from the experience of thousands of farmers in all parts of the country who have used all kinds, sizes, types and styles of barns and other farm buildings.

In the Starline Plan Department there is definite practical information with respect to nearly every idea that has been advanced from time to time with respect to barns.

Starline offers you a practical way to apply to your own needs the experience of thousands of others.

You can bring your building problems to Starline with the assurance that you will get authoritative advice.

Blue prints of floor plans and stock details are furnished absolutely without charge or obligation, there being a charge only for special work.

Plan also to use Starline equipment in your barn, not merely to make the

cows clean, safe, and comfortable, but because this same cleanliness, comfort, and safety pays big dividends.

The difference between what a cow could produce under safe, clean, sanitary conditions, and what she actually produces is just what it costs the average farmer at every milking for going up against Nature's laws.

Nature exacts a heavy toll for defiance of her laws. Cows, like human beings, get sick, nervous and run down. Unless they are made comfortable they become susceptible to all kinds of diseases, such as tuberculosis, typhoid, pneumonia and abortion.

It pays to use Starline equipment, because Starline equipment embodies features—many of them exclusive—calculated to give a cow that supreme comfort which enables her to do her best.

Send to Starline a sketch of the barn you propose to build and we will gladly work out the details of a floor plan and send you a blue print without charge or obligation. On this blue print will appear the equipment that is recommended for your consideration.



How Starline Stalls Increase Your Profits

IT'S the extra profits from your cows that make Starline stalls worthwhile.

Keep Cows Clean, Safe, Comfortable and Profitable

Starline stalls hold cows safely and prevent accidents that are costly. They give each cow a space that is all her own, eliminating ruined udders and other expensive accidents that come from crowding, trampling and stepping on each other.

Head Off Costly Diseases and Accidents

They permit the free circulation of air, doing away with damp dead-air pockets that help to spread T. B. and other costly diseases. They cut down the losses from accidents.

Save Time and Trouble

They save time in tying and untying the cows—valuable time that can be profitably used to do other work.

Neat Simple Construction Means Added Cleanliness

They are of the simplest possible construction; each stall front is made of one continuous piece of pipe without clamps or couplings. The top of the arch is smooth and round, nothing to mar the appearance or catch dust and dirt.



Combine Pasture Freedom With Barn Comfort

They combine the freedom of the pasture with the comfort of the barn, assuring the best results from feeding, breeding and care.

Eliminate Restlessness That Holds Down Production

They permit cows to turn their heads clear around to look or lick behind, preventing nervousness that otherwise cuts down milk production.

Starline Unit Stalls Are Double Post Stalls and Have Double Strength



Starline
Unit
System
Stalls

Starline
Straight
Line
Stalls

The Star Unit Stalls in the upper row have twice as many uprights or stall posts as our "straight line" stalls below.

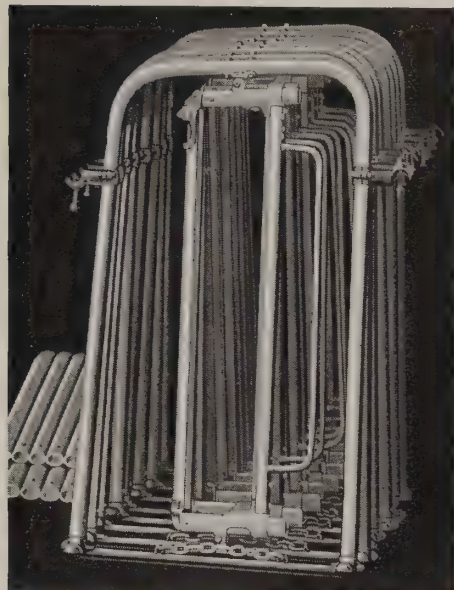
STALLS can be furnished in an almost endless number of combinations. The illustration at the left shows the two general types of stalls. The lower illustration shows our No. 1700 single post straight line stalls. The upper illustration shows unit stalls.

Notice that the unit stall provides twice as many uprights—two stall posts between every two cows (instead of one as shown in the straight line stall below). The material in both stalls is exactly the same. So the uprights in the arch stall, being twice as many are practically twice as strong.

The unit stall front is assembled before it is shipped. Even the stanchion is hung in the stall frame. When a thing comes assembled you know it is all there; every piece and part is properly bolted into place. This saves much trouble and expense. In our big plant with machinery and facilities in the hands of men who have been at it for years, it doesn't take long and it doesn't cost much to assemble a stall. But think how much of your time it might take to assemble stalls with ordinary tools, especially when you are doing the job for the first time in your life.



Starline Unit Stalls Are Assembled Before Shipping



This Shows the way STAR Stalls come to you—ready for installation the minute they arrive

IN THE installation of the unit stall there is nothing to do but insert the two bolts that hold the stall arm to the stall partition.

Moreover, the stall front is in one piece. One-piece construction is always the simplest, and the simpler anything is made the further it keeps away from trouble.

The arch construction is simplicity itself. It is practically trouble-proof.

How Double Post Unit Stalls Save Feed

Suppose a cow is eating ground feed. A fly lights where she can't reach it with her tail, or something else happens that makes a cow want to see what's going on behind. Without stopping to raise her head she swings it back over the curb. When she has all the room provided in the single post stall she throws feed back as she swings her head. In a single post stall three and one-half feet wide there is fully two feet between the stall post and the stanchion bar that is farther away from the post.

In the unit stall the arches are twenty-eight inches wide. This means that the distance from the stall post to the farthest stanchion up-right is about eighteen inches. That's plenty of room for the cow to turn her head as shown in the illustration below. But in a unit stall the cow has to keep her nose down and she brings her head back slowly. There isn't the same possibility of working feed back into the stall and wasting it.

Daily Waste Mounts Up in a Year's Time

One mouthful of feed doesn't amount to much. But with thirty cows doing that same thing all day long, especially in fly time, a waste of feed eventually runs into tons and runs into money. So there is a very definite and substantial saving of feed which can be made by using double post arch stalls.

Saving of Feed Alone Will Pay for Unit Stalls

Suppose this loss is only a half pound a day for each cow. That would be 180 pounds a year—5,400 pounds

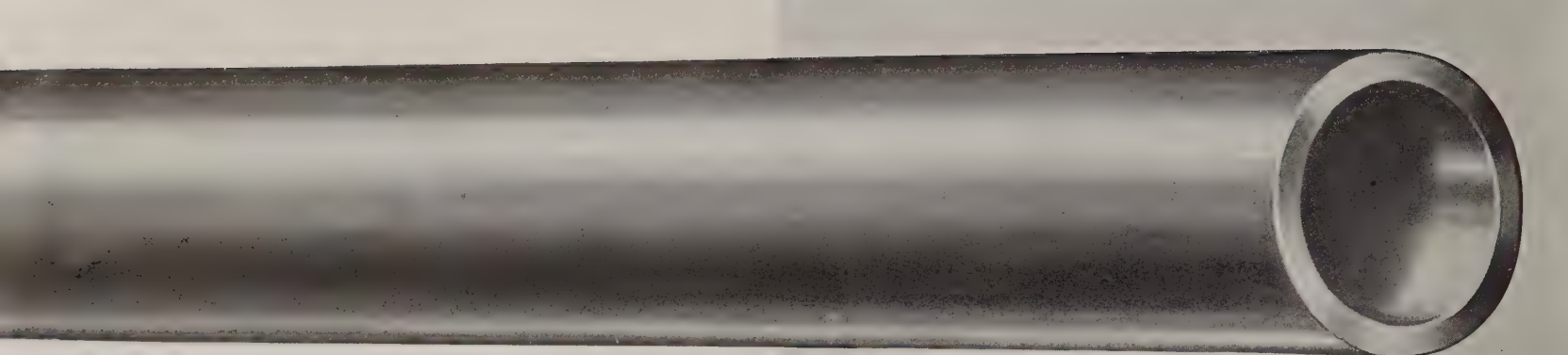
for thirty cows—or $2\frac{1}{2}$ tons. At only \$25.00 that would amount to around \$60.00—mighty good interest on your whole investment in unit system stalls.

Saving Is Repeated Each Year

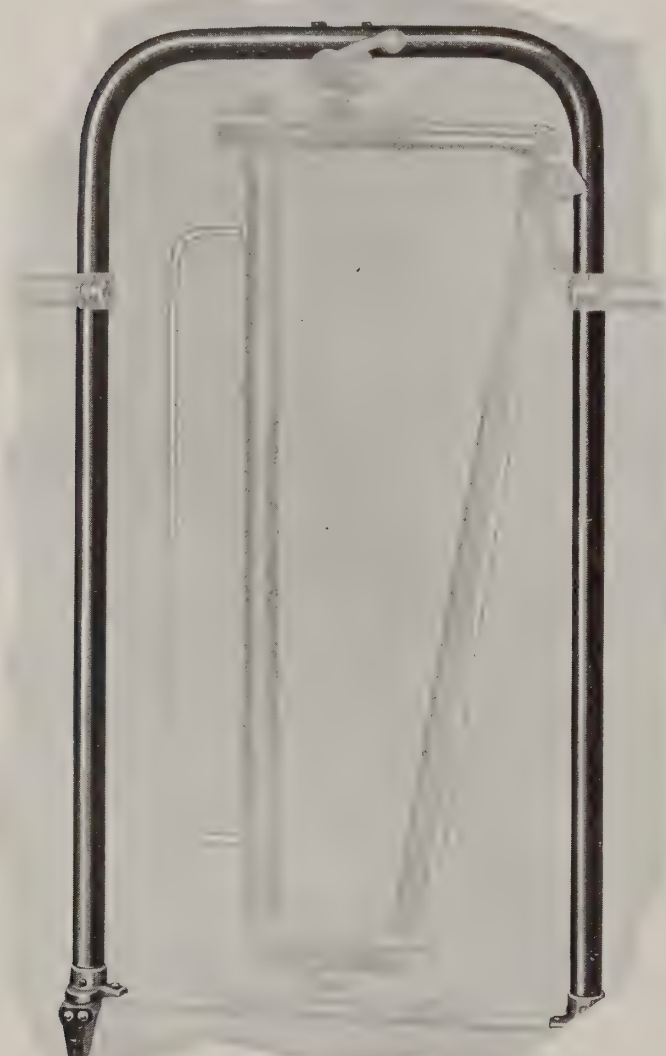
Unit system double post stalls cost a little more because there is more material in them, but this slight difference in cost is more than made up by the feed the unit system stall saves. Every year you can count on a substantial saving of feed.



Star Unit Stalls Afford Plenty of Freedom But Prevent Feed Being Worked Back Under Foot



THICKER MATERIAL *Guarantees* LONGER LIFE *for* STARLINE STALLS



Rust has no respect for strength or for unnecessary stiffness in steel. Like starch in a collar, carbon does make steel stiffer. But carbon has a notorious affinity for oxygen. That's why thick pipe is worth the extra money that it costs; it is more nearly free of carbon impurities which cause steel to oxidize (rust) so much faster—especially in the warm moist atmosphere of the dairy barn.

The stiffness of steel is not even distantly related to those things which make equipment last.

Any kind of material may be strong enough the day your stalls are set up. The question is, how will they stand up after years of use—and rusting?

The very process of manufacturing STARLINE stalls prohibits the use of anything but *tough pipe of full thickness* which will hold its strength for many long years of use after cheaper material might have rusted out.

Every piece of pipe used in STARLINE Unit Stalls passes through a powerful machine where it is bent cold without heating. This cold bending process constitutes a practical test for every single piece of pipe.

Nothing below the STARLINE standard of full thickness pipe can pass through the bending machine. It breaks at the bend; its brittleness betrays excess carbon and uneven quality.

This practical test of every piece of pipe insures that quality which has earned for STARLINE stalls the reputation of lasting so much longer.

Wouldn't you be willing to pay a little more for equipment if you knew it would last longer? That's a question you don't have to decide because while STARLINE stalls will last longer—you pay no more.

STARLINE Unit Stalls are built of full weight, butt welded, tested pipe. It has a thickness of 14/100 of an inch.

Full weight pipe weighs about 27% more than tubing ordinarily used in the manufacture of cow stalls and it costs about that much more than tubing.

The extra weight may not mean much, but the *extra thickness* does. The thicker the material, the longer it will stand up under the ravages of rust.



TWELVE
TIMES
MORE
WEAR

WEAR PROOF
TOP CONNECTION
FOR STARLINE
STANCHIONS

When a cow lies down she throws her shoulders into the stanchion. When she gets up, she pulls back on it. Every time she reaches for feed or turns her head to see what's going on behind her there is a heavy strain on the top connection. Every time a cow moves, the stanchion moves too.

The double bolted drop forged swivel head and extra heavy cup shaped swivel plate provide a bearing that is practically wear-proof.



End view of the drop forged swivel shows how the underside of the pipe which forms the stall arch is pressed into a V-shape so that the heavy swivel plate gets a long wide bearing, fits perfectly and cannot twist or work loose on the pipe.

Authorities agree that drop forgings will stand wear many times better than any other metal that would be practical to use as a stanchion hanging.

In a shop test started in June 1933 a series of stanchions was connected with the drive rod to a motor. The drive rod went back and forth fifty times a minute. At each stroke of the drive rod the stanchions were turned. No oil or grease was used in the swivels. Doors to the room were kept closed to hold in the noise from the screeching swivels as the drive rod went relentlessly back and forth.

At the end of four years micrometer measurements indicated that the swivel and swivel head had worn down only .007 of an inch.

Figuring that old style stanchion fastenings lasted about fourteen years on an average, the four-year test would indicate a life of about 180 years for the stanchion fastening illustrated above—but the test is still going on.

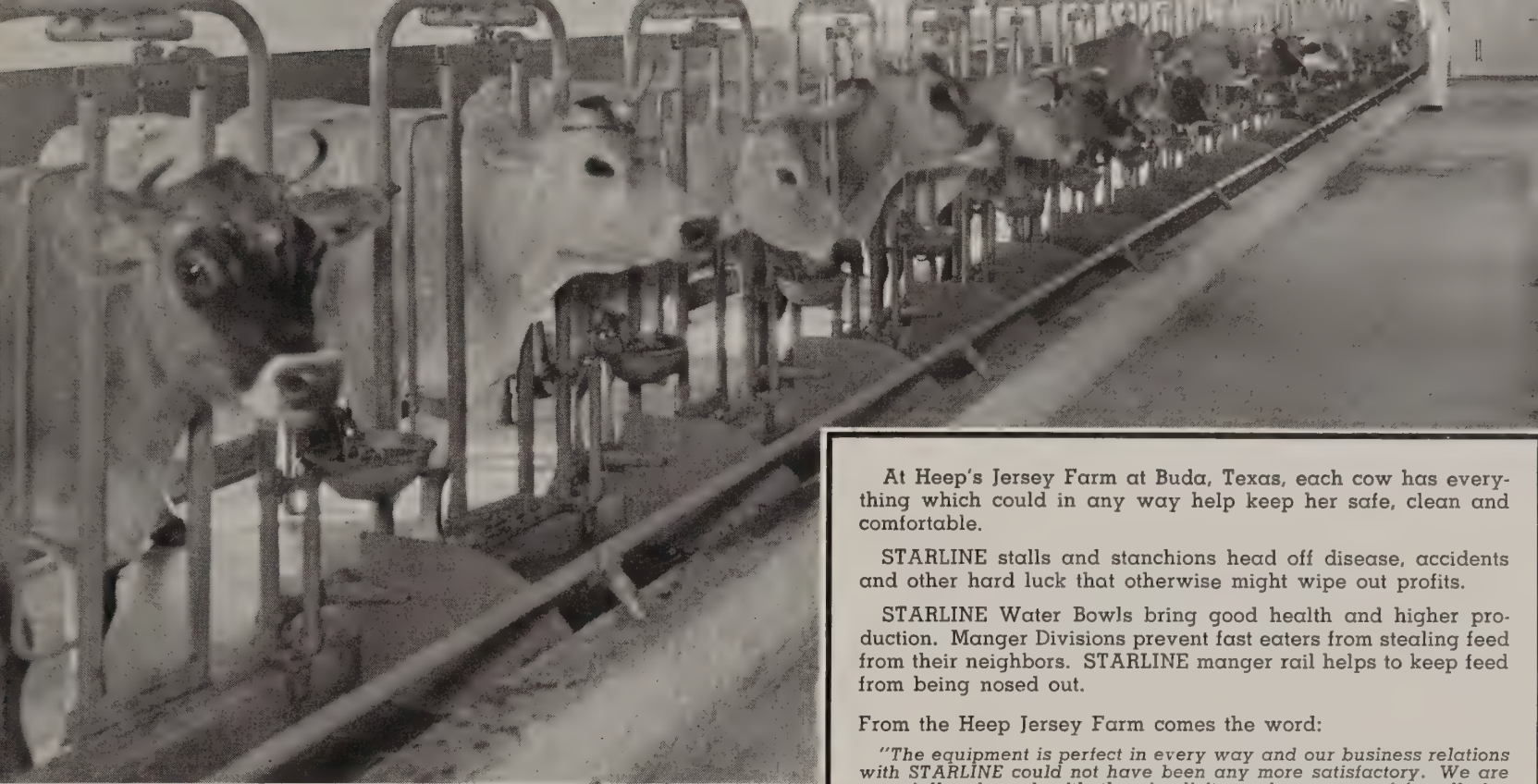
THE SIMPLE
Trouble-proof
CONSTRUCTION
OF THIS STALL
MEANS ADDED YEARS
OF USE

No. 27 STARLINE UNIT SYSTEM STALL

Stall frame assembled before shipping.
Simple one-piece arch and double post
construction give added strength and pre-
vent waste of feed.

MANGER
DRAIN
OUTLET

Each No. 27 STARLINE Unit Stall includes stall frame, double bolted stall arms, bottom anchor for stanchion and one partition. The No. 259W adjustable steel stanchion shown above is not a part of the stall. Any other STARLINE stanchion may be used. Rust Shield and sure stop may be included before shipment. Manger Divisions, water bowls, salt cups, name plates, neck chains and alignment devices may be added at any time.



Specifications No. 27 STARLINE Unit System Stall

ARCH. High grade, full weight, new and tested pipe $1\frac{1}{2}$ in. outside diameter. Thickness of pipe wall .14 in. Width 28 in. unless otherwise specified. Height over all, above stall floor, 61 in.

STALL ARMS. Clamped to arch and double bolted through end of partitions. Width of stall determined by length of stall arms (regular widths 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in., and 3 ft. 8 in.). The 3 ft. 6 in. width is most generally used and is a regular requirement in many localities. Other widths to order.

PARTITIONS. Triple bend, made of full weight new and tested pipe $1\frac{1}{2}$ in. outside diameter. Thickness of pipe .14 in.

STANCHION ANCHOR. No. 628 anchor inserted in curb with detachable clevis holding end of heavy five link chain. No. 1247 pipe anchor may be used instead of No. 628 when specified without additional cost.

FINISH. All pieces and parts are sanded and polished, dry cleaned and baked dry to remove all mill scale, rust, grease and moisture. Two coats toughest, highest grade rust and ammonia resisting enamel baked on permanently.

WEIGHT. Average weight per stall including stanchion 70 lbs. Weight of extra partition without rust shield 15 lbs.

STANCHIONS TO BE SELECTED

STANCHIONS. Any STARLINE stanchion may be used with the No. 27 stall. The stanchion illustrated on the opposite page is the No. 259W STARLINE wood-lined steel stanchion adjustable in neck width from five to nine inches; with one hand triple lock. Heavy steel guide relieves the stanchion hinge of all strain. Forked device on the upper end of moving upright engages side of stall arch to keep stanchion from swinging while open. Stanchion uprights are of high carbon steel U-bars $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{3}{16}$ in.

At Heep's Jersey Farm at Buda, Texas, each cow has everything which could in any way help keep her safe, clean and comfortable.

STARLINE stalls and stanchions head off disease, accidents and other hard luck that otherwise might wipe out profits.

STARLINE Water Bowls bring good health and higher production. Manger Divisions prevent fast eaters from stealing feed from their neighbors. STARLINE manger rail helps to keep feed from being nosed out.

From the Heep Jersey Farm comes the word:

"The equipment is perfect in every way and our business relations with STARLINE could not have been any more satisfactory. We are especially pleased with the simplicity and economy of installation and like the easy and quick method of adjusting the stanchions to long and short cows."

HEEP JERSEY FARM."

Hard wood lining shaped to fit, held in place by four bolts with countersunk flat heads.

OPTIONAL FEATURES

SURE STOP. Made of $\frac{5}{8}$ in. bowed steel. Permanently fastened to the stanchion uprights. Operates automatically as stanchion swings. Must be attached at factory.

ALIGNMENT DEVICE. Built entirely of heavy steel and best grade malleable iron. Adjusts stanchion forward or back five positions in $11\frac{1}{2}$ in., while cow is in stall. May be included with stalls or added at any time.

RUST SHIELD. Heavy malleable sleeve filled with electrolytic insulating rust proof grease. Prevents partition rusting off at floor. Must be put on at factory.

MANGER DIVISIONS. May be ordered with stalls or added later. In either case the manger must be properly shaped by the use of STARLINE steel manger templates which are available for that purpose.

NAME PLATES. May be included with stalls or added at any time.

WATER BOWLS. Any of the STARLINE water bowls may be included with the No. 27 stall or added later.

Each No. 27 unit stall includes one stall front and one partition. When ordering be sure to include an extra partition for each row if there is a cross alley at both ends of the row, or a No. 625 wall bracket if one end of the row is at a post, a column or a partition. Be sure to include clamps for posts or columns in stall row or at rear end of partitions and state size. Send sketch with measurements showing location of posts.



S T A R L I N E I N C.



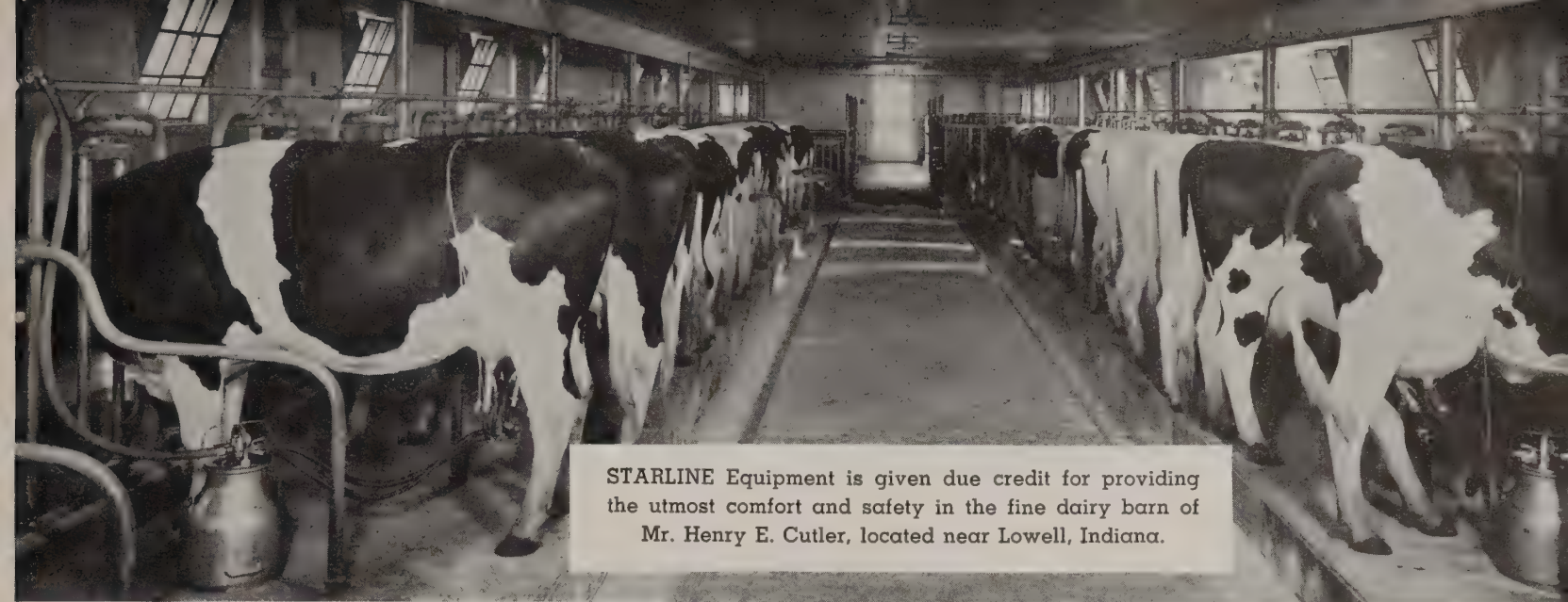
The Value

OF THE FEATURES
OF THIS STALL
SHOWS UP IN
EVERY DAY USE

No. 13 STARLINE UNIT SYSTEM STALL

Stall frame assembled before shipping with bottom bar and double chain stanchion fastening. Stall includes stall frame, double bolted stall arms, bottom fastening, and one partition. Your choice of stanchions assembled in stall frame.

No. 260W Stanchion shown above is not a part of the stall; any STARLINE stanchion may be used. The rust shield shown on the stall partition *may* be omitted but *should* be included to make the most satisfactory job. Manger divisions, water bowls, salt cups, name plates, neck chains and alignment devices may be included or may be added at any time. Sure Stops may also be used but they must be attached to stanchions before shipping.



STARLINE Equipment is given due credit for providing the utmost comfort and safety in the fine dairy barn of Mr. Henry E. Cutler, located near Lowell, Indiana.

Specifications No. 13 STARLINE Unit System Stall

ARCH. High grade, full weight, new and tested pipe 1½ in. outside diameter. Thickness of pipe wall .14 in. Width 28 in. unless otherwise specified. Height over all, above stall floor 61 in.

STALL ARMS. Clamped to arch and double bolted through end of partitions. Width of stall determined by length of stall arms (regular widths 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in., and 3 ft. 8 in.). The 3 ft. 6 in. width is most generally used and is a regular requirement in many localities. Other widths to order.

PARTITIONS. Triple bend, made of full weight new and tested pipe 1½ in. outside diameter. Thickness of pipe .14 in.

BOTTOM FASTENING. Double chain with end links upset in slots in U-bar. Ends of U-bar bracketed to stall posts. Eliminates direct connection between stanchion and curb. Easily replaced.

FINISH. All pieces and parts are sanded and polished, dry cleaned, and baked dry to remove all mill scale, rust, grease and moisture. Two coats toughest, highest grade rust and ammonia resisting enamel baked on permanently.

WEIGHT. Average weight per stall including stanchion 76 lbs. Weight of extra partition without rust shield 15 lbs.

STANCHION (to be selected). Any STARLINE stanchion may be used with a No. 13 Stall. The stanchion illustrated on the opposite page is the No. 260W triple lock stanchion adjustable in neck width from five to nine inches; one hand cow proof triple lock. A heavy steel guide relieves the stanchion hinge of all strain. The crotch device at the upper end of the movable upright engages the side of the stall frame and prevents the stanchion from swinging while open. Stanchion uprights of high carbon steel U-bars 1¼ x 1¼ x 3/16 in. Kiln dried hard maple lining completely filling U-bars held in place by 1¼ in. drive screws. Adds 30 to 40% to the strength of the stanchion bars.

OPTIONAL FEATURES

SURE STOP. Made of ⅝ in. bowed steel. Permanently fastened to the stanchion upright. Operates automatically as stanchion swings. Must be attached at factory.

ALIGNMENT DEVICE. Built entirely of heavy steel and best grade malleable iron. Adjusts stanchion forward or back five positions in 11½ in., while cow is in stall. May be included with stalls or added at any time.

RUST SHIELD. Heavy malleable sleeve filled with electrolytic insulating rust proof grease. Prevents partition rusting off at floor. Must be put on at factory.

MANGER DIVISIONS. May be ordered with stalls or added later. In either case the manger must be properly shaped by the use of STARLINE steel manger templates which are available for that purpose.

NAME PLATES. May be included with stalls or added at any time.

WATER BOWLS. Any of the STARLINE water bowls may be included with the No. 13 stall or added later.

Each No. 13 unit stall includes one stall front and one partition. When ordering be sure to include an extra partition if there is a cross alley at both ends of the row or a No. 625 wall bracket if one end of the row is at a post, a column or a partition. Be sure to include clamps for posts or columns in stall row or at rear end of partitions and give size. Send sketch with measurements showing location of posts.



Cows on Mr. Vincent Astor's estate at Rhinebeck, N. Y., are stanchioned in STARLINE Stalls.

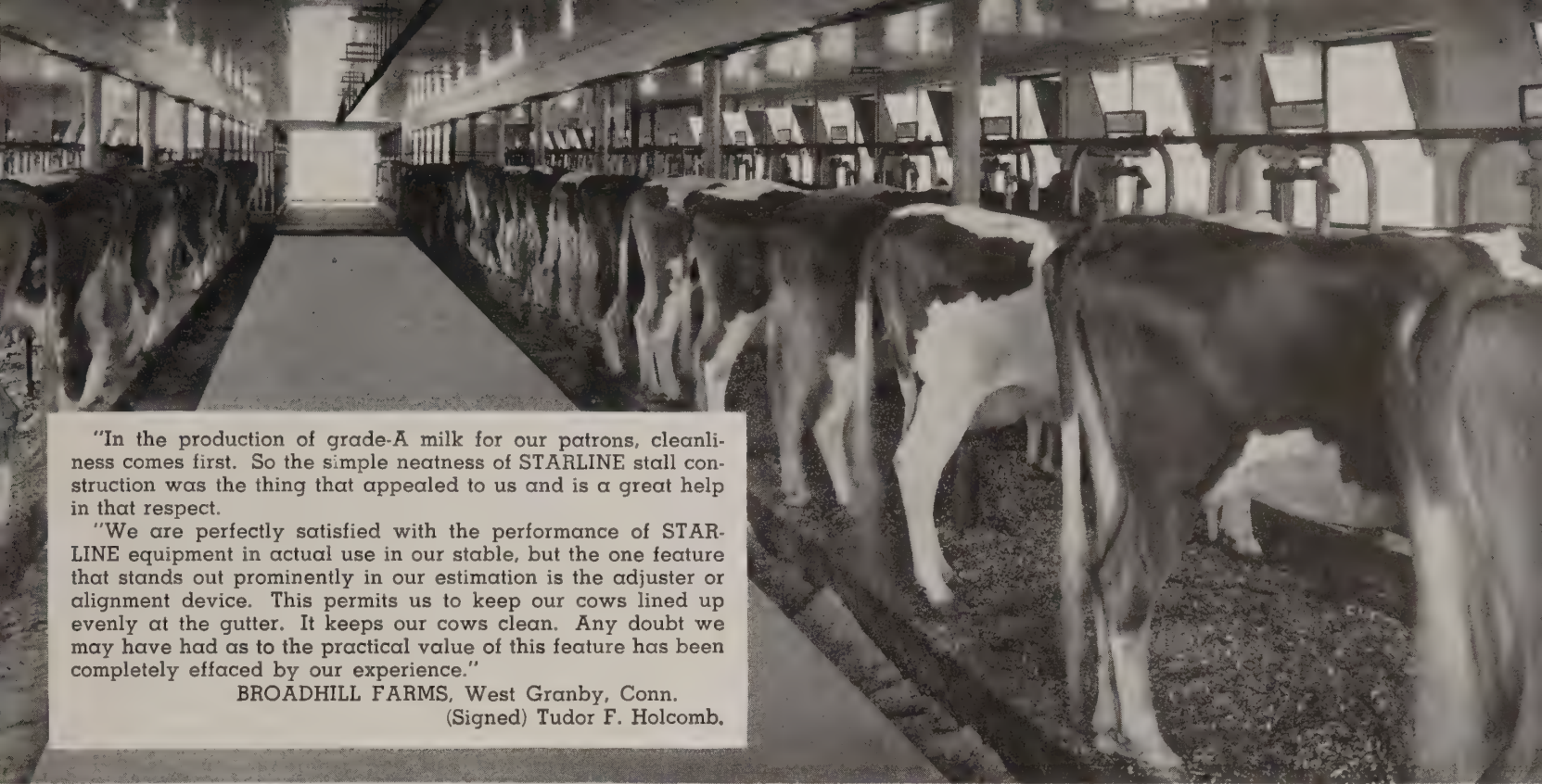
*Easiest
to Install*

**KEEPS COWS
SAFER·CLEANER AND
MORE COMFORTABLE
SAVES TIME·WORK
AND WORRY**

No. 10 STARLINE UNIT SYSTEM STALL

Stall frame assembled before shipping with bottom bar and double chain stanchion fastening. It includes STARLINE curb clamps, so all the concrete work can be done before stalls are set up. Your choice of stanchions assembled in frame.

No. 10 STARLINE Unit Stall includes stall frame, stall arms, bottom fastening, curb clamps and one partition. No. 486 Giant Stanchion shown above is not a part of the stall. Any STARLINE stanchion may be used. Rust shield, sure stop and gutter drain as shown may also be included as may also manger divisions, water bowls, salt cups, name plates and neck chains. Alignment Device may be added at any time.



"In the production of grade-A milk for our patrons, cleanliness comes first. So the simple neatness of STARLINE stall construction was the thing that appealed to us and is a great help in that respect.

"We are perfectly satisfied with the performance of STARLINE equipment in actual use in our stable, but the one feature that stands out prominently in our estimation is the adjuster or alignment device. This permits us to keep our cows lined up evenly at the gutter. It keeps our cows clean. Any doubt we may have had as to the practical value of this feature has been completely effaced by our experience."

BROADHILL FARMS, West Granby, Conn.

(Signed) Tudor F. Holcomb.

Specifications No. 10 STARLINE Unit System Stall

ARCH. High grade, full weight, new and tested pipe 1½ in. outside diameter. Thickness of pipe wall .14 in. Width 28 in. unless otherwise specified. Height over all, above stall floor 61 in.

STALL ARMS. Clamped to arch and double bolted through end of partitions. Width of stall determined by length of stall arms (regular widths 3 ft., 3 ft. 3 in., 3 ft. 4 in., 3 ft. 6 in., and 3 ft. 8 in.). The 3 ft. 6 in. width is most generally used and is a regular requirement in many localities. Other widths to order.

PARTITIONS. Triple bend, made of full weight new and tested pipe 1½ in. outside diameter. Thickness of pipe .14 in.

CURB CLAMPS. Made of best grade malleable iron. Jaws drawn together by ¾ in. x 7/8 in. draw bolts.

BOTTOM FASTENING. Double chain with end links upset in slots in U-bar. Ends of U-bar riveted to stall foot. Eliminates direct connection between stanchion and curb. Easily replaced.

FINISH. All pieces and parts are sanded and polished, dry cleaned and baked dry to remove all mill scale, rust, grease and moisture. Two coats toughest, highest grade rust and ammonia resisting enamel baked on permanently.

WEIGHT. Average weight per stall including stanchion 90 lbs. Weight of extra stall partition 17 lbs.

STANCHIONS TO BE SELECTED

STANCHIONS. Any STARLINE stanchion may be used with a No. 10 stall. The stanchion illustrated with it here is the No. 486 Giant STARLINE Stanchion adjustable in neck width from five to nine inches; one hand cow proof lock. Malleable guide relieves hinge of all strain. Lockout device prevents

stanchion from swinging while open. Uprights are high carbon steel U-bars 1¼ x 1¼ x 3/16 in., kiln dried hard maple lining completely filling U bars. Held in place by 1¼ in. drive screws. Adds 30 to 40% to the strength of the stanchion bars.

OPTIONAL FEATURES

SURE STOP. Made of 5/8 in. bowed steel. Permanently fastened to stanchion upright. Operates automatically as a stanchion swings. Must be attached at factory.

ALIGNMENT DEVICE. Built entirely of heavy steel and best grade malleable iron. Instantly adjustable with cow in stall to five positions in 11½ in. May be included with stall or added at any time.

RUST SHIELD. Heavy malleable sleeve filled with electrolytic insulating rust proof grease. Prevents partitions rusting off at floor. Must be specified. Put on at factory only.

MANGER PARTITIONS. May be ordered with stalls or added later if manger is properly shaped by STARLINE steel manger templates which are available for that purpose.

NAME PLATES. May be included with stalls or added at any time.

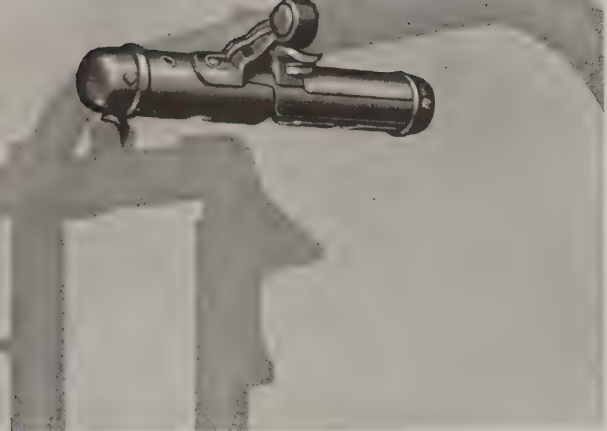
WATER BOWLS. Any of the STARLINE water bowls may be included with No. 10 stalls or added at any time.

Each No. 10 unit stall includes one stall front and one stall partition. When ordering be sure to include an extra partition for each row if there is a cross alley at both ends of the row or a No. 625 wall bracket if one end of the row is at a post, a wall or a partition. Also include clamps for posts or columns in stall row or at rear end of partitions and give size. Send sketch with measurements showing location of posts and size.



S T A R L I N E I N C.





For **CLEANER MILK** *From* **CLEANER COWS**



No. 765 STARLINE ALIGNMENT DEVICE

The No. 765 STARLINE Alignment Device instantly aligns the cow at the gutter.

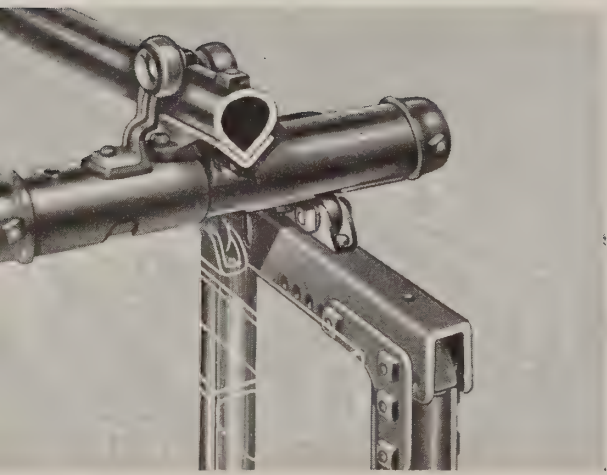
No matter how the herd changes, the stanchions can be adjusted to the length and size of the cow. It takes no longer to make the adjustment than it does to lock the stanchion.

The adjustment is made while the cow is in the stall. So easy a small boy can do it. No tools needed—not even a monkey-wrench. Just raise the handle and shove the stanchion forward for large cows or backward for short cows. Five different positions in 11½ inches.



KEEPS SHORT COWS CLEAN

If a cow stands with her heels at the drop, the bedding remains clean and so does the cow—a long step towards the production of clean milk without the labor of cleaning the cow.



AVOIDS COSTLY ACCIDENTS

When the stanchion is adjusted forward to give long cows plenty of shoulder room, they won't have to stand with their hind feet in the gutter. Contagious abortion has been wrongfully charged with the loss of many calves which occurred where cows strained their abdominal muscles and lost their calves just because they habitually stood with their hind feet in the gutter.

Keep your short cows clean, your big cows safe and all your cows more comfortable with Starline Alignments.

No. 765 STARLINE Alignment Device can be included with STARLINE Unit Stalls or added at any time. Weight each 5 lbs.

FOR STANCHIONS IN WOOD FRAMES

No. 765W Alignment Device can also be furnished. Weight each 5 lbs.



S T A R L I N E I N C .





No. 685 STARLINE Curb Clamp

Makes it possible to build the entire floor including the curb before the stalls are erected.

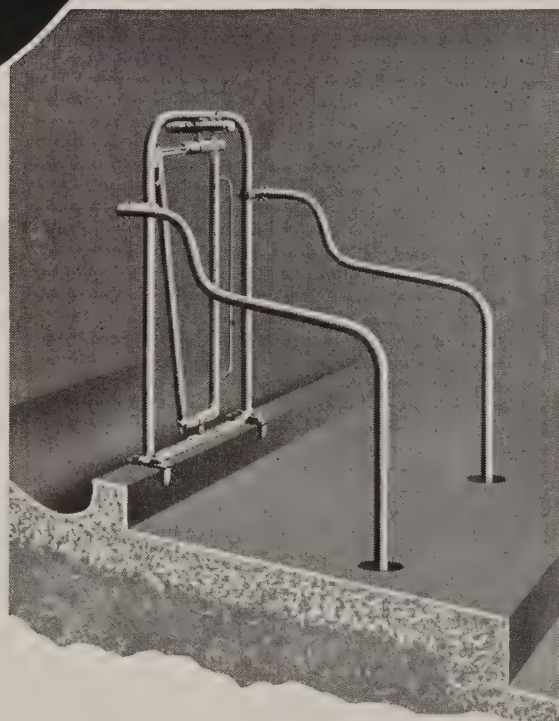
Just think what it means to be able to pour the entire concrete floor without having to dodge around among fixtures and braces—and how much nicer and smoother both curb and floor can be made where there is nothing to interfere with the work.

STARLINE Curb Clamps eliminate the danger of getting anchors set wrong and of having to knock out and rebuild the curb. At the same time they make it possible to go ahead with your concrete work and finish the job before the equipment arrives.

Simply drop the curb clamps over the curb. Then bolt the stall arches to the clamps. Tighten the bolts and the job is done. A simple, convenient, economical and permanently satisfactory installation.

Take-up feature of the curb clamp insures a solid and satisfactory job after years and years of continuous hard use.

A STARLINE Curb Clamp consists of two malleable jaws adjustable to the curb by means of draw bolts. Weight each 2 pounds.



By leaving six-inch holes at the cow bed as far apart as the stalls are wide, the installation is completed by clamping the stall arches to the curb and filling in around the partitions with thin rich cement. Cannot be used with Taper Top Curbs.



HUNT • HELM • FERRIS & CO.



STARLINE RUST

Prevent Partitions Rusting at the Floor Line — Save the Life of the Partitions . . . Double the Life of Stalls

When stall partitions rust off, it puts too much strain on other parts; it lets go in other places.

Time has proved that rust had no respect for quality; the very best partitions rusted at the floor.

To prevent rusting, many farmers had the concrete floors "hilled up" around stall partitions. This slowed down rusting but did not stop it. Others had their partitions made shorter than regular. This did not help. Wet bedding was blind to the border line of the moisture zone; it packed around the partition as always and rusting continued.

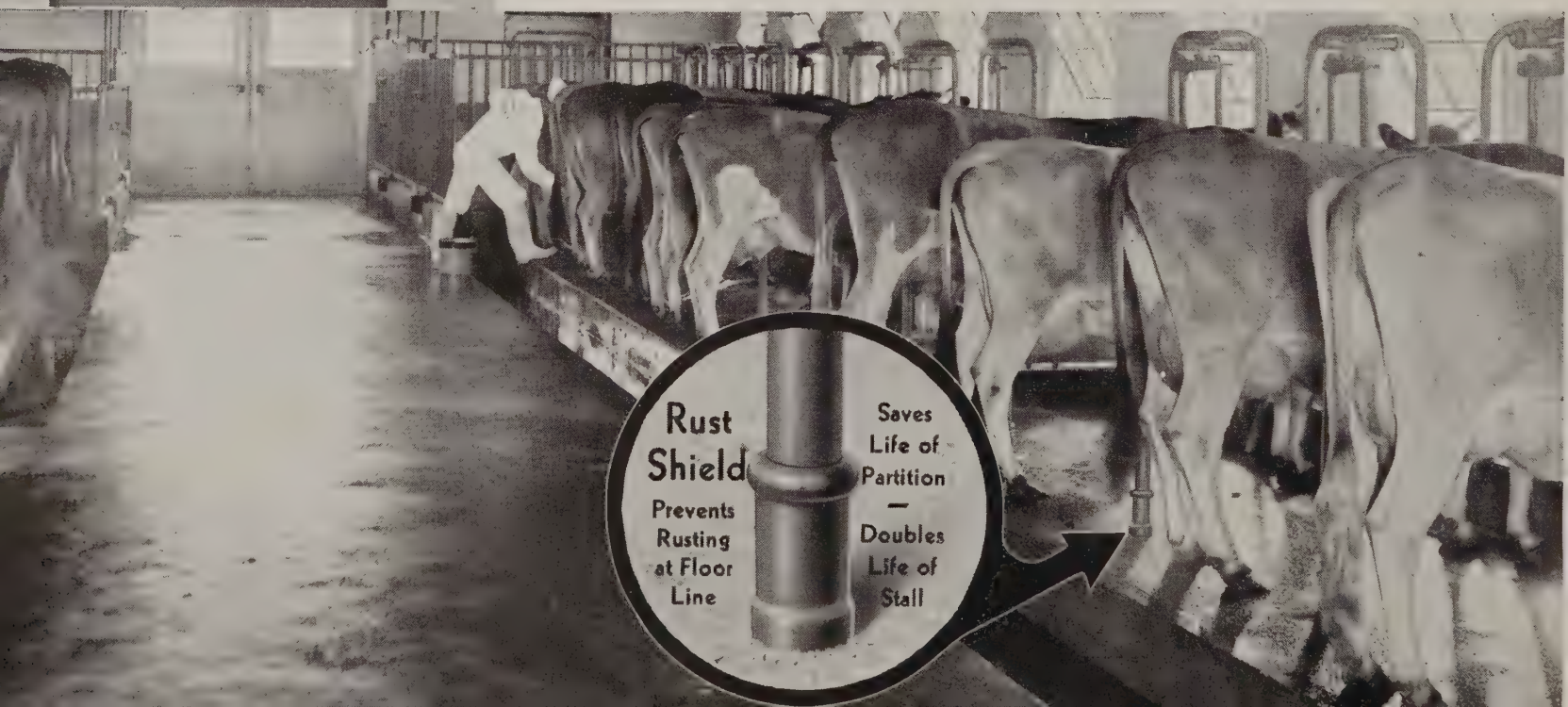
Plating and galvanizing have been tried but many have reported that galvanized partitions seem to rust off even faster.

In the presence of moisture which is even mildly acid there occurs the same chemical action which actuates an electric battery, when two metals with the characteristics of zinc and steel get together; destructive action becomes much more rapid than ordinary rusting.

Rust, unless headed off, takes a terrible toll—no matter where the partitions are set—no matter whether they are galvanized or painted.

STARLINE Rust Shield is the only scientific and reliable means of preventing rust at the floor line.

PATENTED



SHIELDS

WET BEDDING RUSTS PARTITIONS NO MATTER WHERE THEY ARE LOCATED

The following statement from Mr. Ben Buttermore of Chippewa Falls, Wisconsin, tells what happens:

"When I put in my 1921 stalls, I had the partitions made six inches shorter to give more room for milking.

"My partitions stand about 23 inches away from the gutter instead of the usual 17 or 18 inches.

"Maybe they didn't get spattered as much as longer partitions would, but there wasn't any way to keep the wet bedding away from them, so my short partitions rusted off just like the long ones do."

BEN BUTTERMORE,
Chippewa Falls, Wis.

The only place where rust seriously shortens the life of stalls is right at the floor line on the partition. Protect this danger line and you save the whole stall.

TROUBLE STARTS AT THE FLOOR LINE IN 99 OUT OF 100 STALLS

"There is only one way that stall partitions can be prevented from rusting off at the floor line and that is to coat them with a rust preventive such as the material used in STARLINE Rust Shields."

There is no substitute for STARLINE Rust Shields. The shield is a sleeve of malleable iron which is virtually rust proof. It is crimped onto the partition right at the *danger line* where the partition goes into the floor. This is done at the factory before the partition is shipped. It is locked on so tightly it cannot be knocked loose.

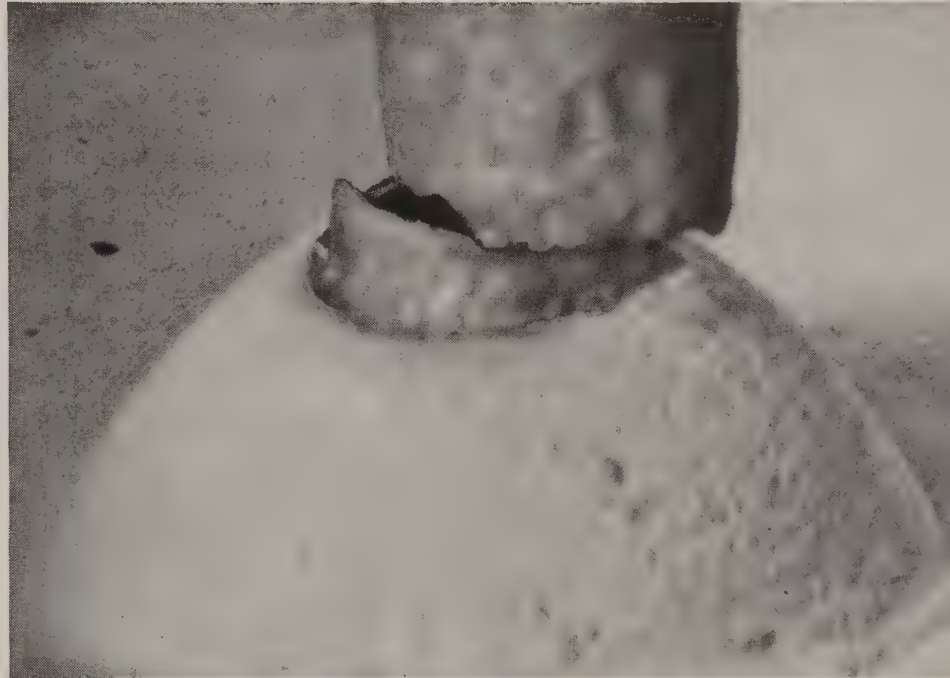
This sleeve is filled with electrolytic insulating rust preventive. The iron shield holds the rust preventive in place. It keeps it from being brushed off or rubbed off as the cows work wet bedding around the base of the partition.

It's the *filling* that does the work. That's the only **POSITIVE** protection against **BOTH** electrolysis and ordinary rust.

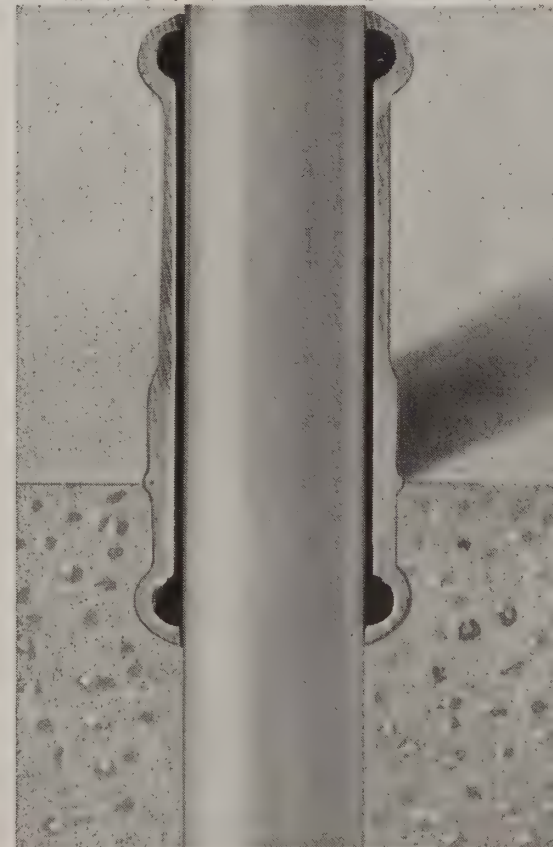
The partitions of any kind of STARLINE stalls **CAN BE SEALED AGAINST RUST** with STARLINE Rust Shields.



THIS IS WHAT HAPPENS TO UNPROTECTED PARTITIONS.



EVEN WHEN CONCRETE IS "HILLED UP," PARTITIONS RUST OFF.





STARLINE Stanchion Adjustment Makes Stanchions Fit Your Herd

No matter how your herd changes, your STARLINE stanchions will always fit.

You can adjust the width of any STARLINE stanchion to accommodate the thickness of the neck of any cow. They can even be widened out for a young bull whose neck is not yet so thick but what he can be stanchioned.

Even a calf as young as that shown in the illustration above can be held in a stanchion if such a necessity ever arises.

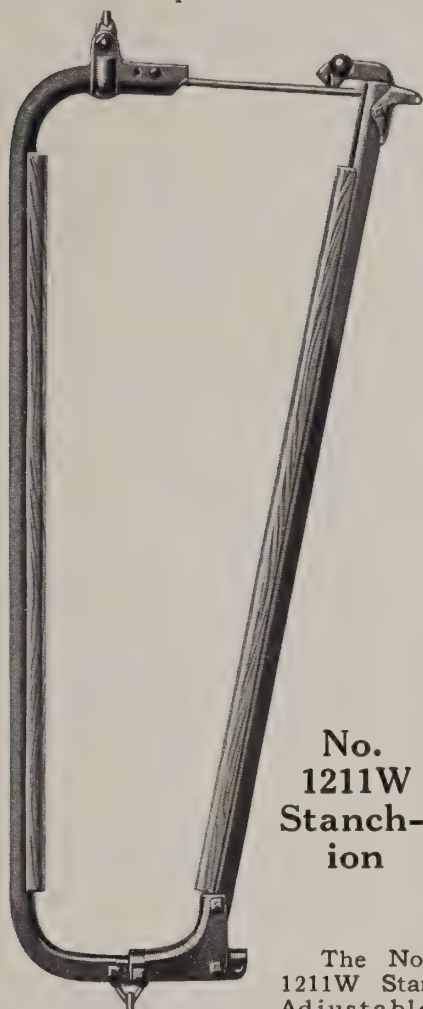


STARLINE Dairy Stable, Harvard, Ill.



STARLINE ADJUSTABLE STANCHIONS

Any Starline stanchion can be used with any of the Starline Unit Stalls or Straight line Stalls illustrated and described on preceding pages. They may also be fitted with five link chains at top and bottom or with swivel top and chain bottom, or with swivel top and double chain bottom to be hung in wood frames.



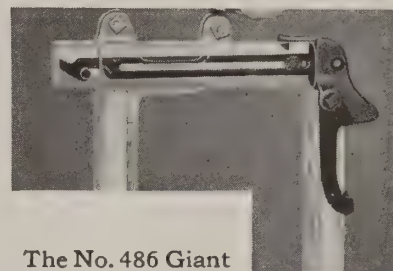
**No.
1211W
Stanchion**

The No. 1211W Star Adjustable Stanchion is the big value in stanchions. It has the Star Knobby Latch which is absolutely cow proof but easily operated with one hand. Sliding steel guide or draw bar takes all strain off the hinge and makes a stanchion easy to lock by slamming it shut. Made of full weight high carbon steel U-bars $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in. Weight chain hung 22 lbs. No. 1211 without wood lining weighs 20 lbs.

In the No. 1285W stanchion, Knobby Latch, sliding guide and inserted wood lining, combined with the adjustable feature, bring this stanchion deserved popularity. Weight, chain hung, 26 lbs. No. 1285 stanchion without wood lining weighs 24 lbs.



**No.
1285W
Stanchion**

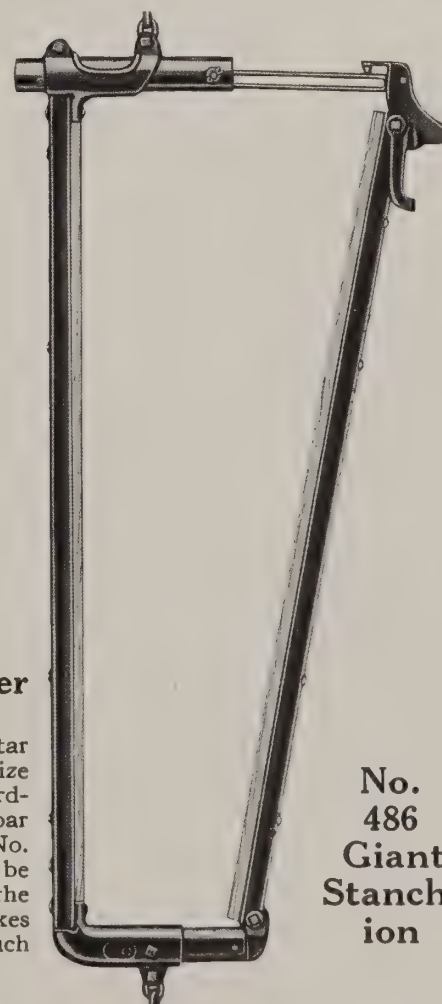


The No. 486 Giant stanchion has the double lock shown in the illustration above.

Both locks can be operated with a simple squeeze of the hand and thumb so that it isn't necessary to set down your pail of milk when you turn the cow loose.

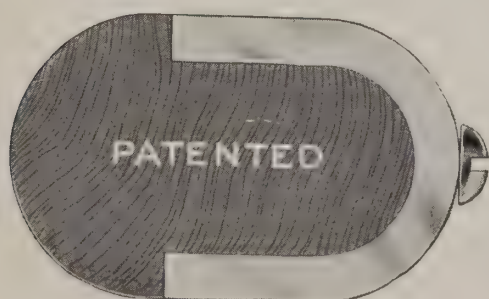
Has sliding guide and inserted wood lining. Weight chain hung 27 lbs.

No. 875 Giant Bull Stanchion adjustable to 12-inch width. Weight swivel hung 29 lbs.

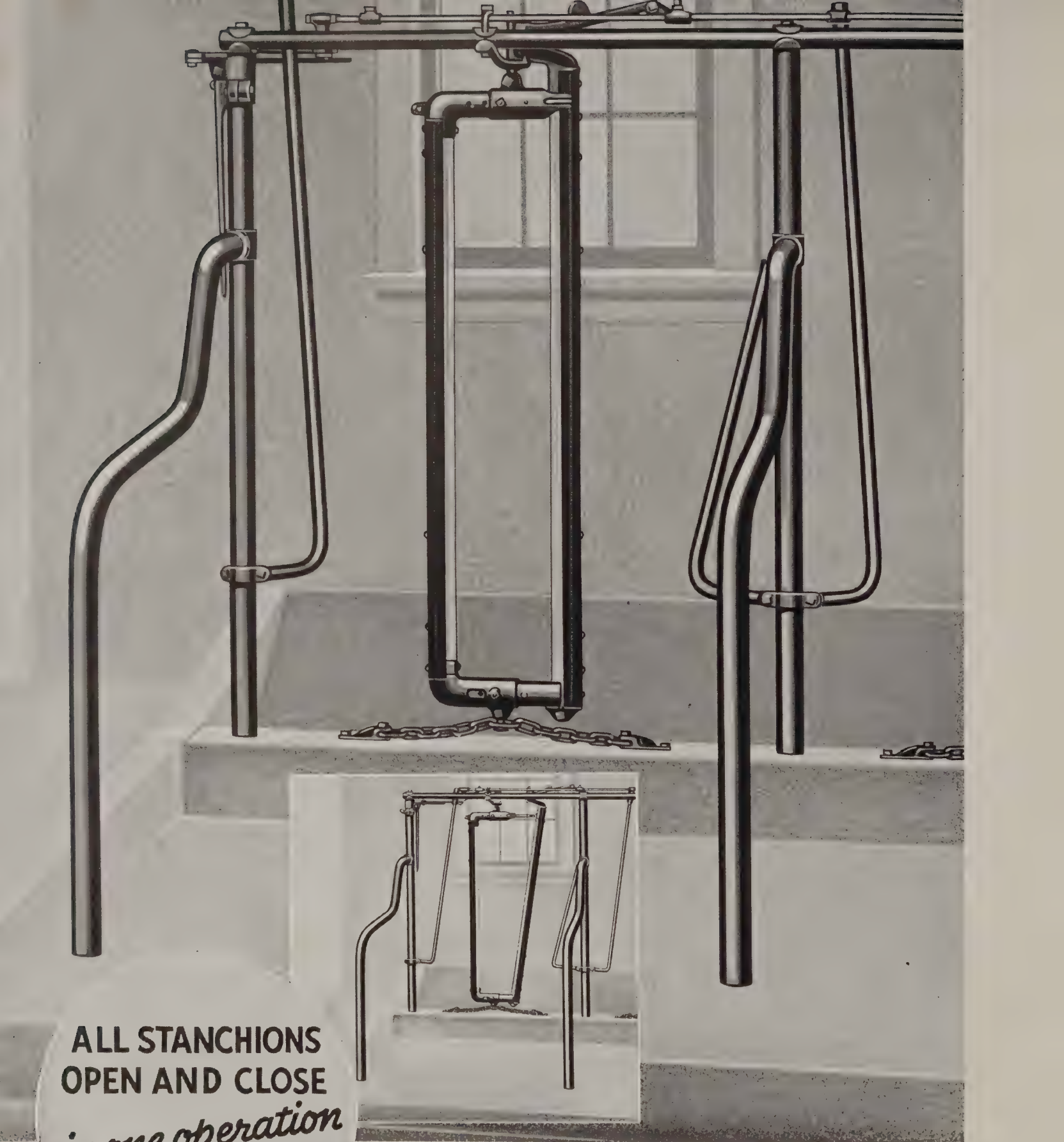


**No.
486
Giant
Stanchion**

Inserted Wood Lining Makes Stanchions Stronger



Inserted wood lining makes Star stanchions stronger. This actual size section shows how the kiln dried hardwood lining is wedged into the U-bar uprights of the No. 1285W and No. 486 stanchions. It cannot possibly be knocked off. It adds about 30% to the strength of each upright and makes these two stanchions just that much stronger.



**ALL STANCHIONS
OPEN AND CLOSE
in one operation
OR ONE AT A TIME**

PATENTED

No. 1302 STARLINE Lever Stall

Includes STARLINE Giant Lever Stanchion, lever rods, lock-out device and double chain bottom fastening with anchors. Does not include stationary sure stop shown at the right of the stanchion, sliding sure stop shown at the left. These may be specified as well as alignment device, rust shields, manger divisions, water bowls and curb clamps.

THE STANCHIONS
IN MY BARN
WORK EASIER
THAN ANY I EVER
SAW

Herman Rebe

WATERTOWN, WIS.



Specifications No. 1302 STARLINE Lever Stall

TOP RAIL. Made of two parallel U bars, size $1\frac{1}{4}$ x $\frac{7}{8}$ in., facing each other and held in place by malleable clamps at the top of every stall post and at every stanchion hanging.

UPRIGHTS AND PARTITIONS. The stall uprights or posts and the triple bend stall partitions are made of high-grade, full weight, new and tested pipe $1\frac{5}{8}$ in. outside diameter. Thickness of pipe wall .14 in.

STANCHION. STARLINE Giant Lever Stanchion. Adjustable in neck width from five to nine inches. Each stanchion may be opened and closed with other stanchions in the series by throwing lever at end of row. May also be opened and closed independently by lifting the latch which is hinged to the parallel lever rods. Malleable guide removes all strain from stanchion hinge. Swivel hanging at top. Double chain hanging at bottom.

UPRIGHTS are high carbon steel U-bars $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{3}{16}$ in., completely filled with kiln dried hard maple linings driven into the U-bar and secured by $1\frac{1}{4}$ in. drive screws.

LEVER. Heavy malleable iron, hinged to a collar that fits loosely around the top of the stall post at the end of the row. Operated horizontally in a half circle—either in front of or behind the stall row. (May be changed at any time.) Hangs down out of the way along the post when not in use.

LEVER RODS. Two $\frac{3}{8}$ in. steel rods, lying parallel along the top rail are connected with the lever. They are also connected with the latch bars of all the stanchions in the series and with all the movable sure stops in the series.

A guide wheel working within the top rail at the lever end of the rods keeps the rods from being bent or pushed into a position where they might rub, wear or pull hard. Heavy malleable ring guides on the top rail keep lever rods in line.

STATIONARY SURE STOPS. Made of $\frac{3}{4}$ in. pipe parallel with the open arm of the stanchion.

SLIDING SURE STOP opens and closes with the stanchion as the lever is operated.

A Swinging Sure Stop may be attached to the stationary upright of the stanchion before equipment is shipped.

LOCK-OUT DEVICE. Provided with each stanchion. Instantly disconnects stanchion from the lever or lets it back on to the lever again as desired.

FINISH. All pieces and parts are sanded and polished, dry cleaned, and baked dry to remove all mill scale, rust, grease and moisture. Two coats toughest, highest grade rust and ammonia resisting enamel baked on permanently.

WEIGHT. Average weight per stall 81 pounds.

OPTIONAL FEATURES

ALIGNMENT DEVICE. Built of steel and heavy malleable iron bolted to underside of top rail. Permits stanchion to be set forward or back. May be included with lever stalls or added at any time.

RUST SHIELD. Heavy malleable sleeve filled with electrolytic insulating rust proof grease. Prevents partition rusting off at floor. Must be put on at factory.

MANGER DIVISIONS. May be ordered with stalls or added later. In either case the manger must be properly shaped by the use of STARLINE steel manger templates which are available for that purpose.

WATER BOWLS. Any of the STARLINE water bowls may be included with the No. 1302 stall or added later.

CURB CLAMPS and **BOTTOM BAR** as described on pages 13 and 17 may be included with lever stalls.

Note. Each lever stall includes one stall front or frame consisting of stall post, double U-bar top rail with clamps, one partition and a Giant lever operated stanchion with lock-out device. With each row or series of stalls must be included one end section with lever and bracket. It is best to send a sketch with orders for lever stalls indicating at which end of the row the lever is to be placed and showing location of posts if any come in contact with stall partitions.

(Posts cannot be placed in stanchion row where lever stalls are used.)

No. 515 STARLINE Individual Steel Manger Partitions



BY USE of Star Individual Manger Partitions the concrete trough can be so divided that each cow has her own feed box. This effectively prevents one cow stealing from another; it prevents waste of feed; it gives the slow eater an even chance and enables you

to give each cow just what you want her to have.

Star Individual Steel Manger Partitions place you in a position to feed properly and get the full value out of the feed consumed. Moreover, the danger of any cow overeating can be eliminated by their use. They accomplish every purpose of the galvanized manger in spite of the fact that they cost less.

While the cows are being fed, Star Individual Steel Manger Partitions stay in place. They are perfectly smooth; no seams, rivets, heads or bolts project; so that it is impossible for the cow to catch hold of them and raise them.

After feeding, when the concrete manger is to be cleaned, the partitions can be lifted and not only raised up out of the trough but tilted clear back out of the way.

The steel of which these partitions are made is $\frac{1}{4}$ inch thick and protected so that the chemical action of water and of the acids in silage has but little effect.

Their construction is so simple that there is nothing to get out of order.

To those who intend to use Star Individual Steel Manger Partitions we furnish a templet or wood form with complete instructions for making the concrete manger of proper shape sent free with other goods when specified.

Finish gray enamel, thoroughly baked on.

No. 515 Star Individual Steel Manger Partitions, for use with any type of Star stalls, weight each, 15 pounds. Be sure to give width of stalls when ordering manger partitions.

No. 1268 STARLINE Feed Guard Rails

THE Star feed guard rail prevents cows from nosing hay and other bulky feed out of the manger. It is $1\frac{5}{8}$ " in diameter. The $1\frac{5}{8}$ " curved supports to which rail is fastened with heavy malleable clamps are inserted 6 or 8 inches above the edge of the manger and 4 to 6 inches in from the manger edge. Supports are placed opposite every third stall partition. Weight per foot, with supports, 2 lbs.



Star Manger Partitions and No. 1268 Feed Guard Rails in Barn of Springfield Dairy Products Co., Springfield, Ohio



NO. 417 CANNON BALL

MILK CAN LIFTER

Easiest, Safest And
Most Economical Means
Of Lifting Cans Into
and Out of Cooling Tank.

Prevents Damage to
Can And Cabinet

This simple inexpensive device puts an end to the back wrenching job of lifting full cans of milk in and out of the cooling tank. It ends the risk of dropping a full can on the foot, or other serious injuries that frequently occur.

A roller bearing double sheave, self-locking hoist equipped with 24 ft. of $\frac{3}{8}$ in. rope makes it easy to raise a loaded can. A flip of the rope locks the hoist and holds the can up off the floor.

Built onto the top of the hoist is a tandem roller bearing Cannon Ball, Jr. truck operating in Cannon Ball, Jr. track. This 6 ft. piece of track is held in place and fastened to the ceiling with two intermediate ceiling brackets and two end brackets.

CAN BE USED IN MILKHOUSES WITH LOW CEILINGS

The Cannon Ball Milk Can Lifter is coupled up so close that only 43 inch clearance is required from the ceiling to the bottom of an eight gallon can, like that shown in the above illustration.

This allows plenty of room between the top of a milk cooler 32 inches high and a $6\frac{1}{2}$ ft. ceiling.

No. 417 CANNON BALL MILK CAN LIFTER, complete with rope and 6 ft. of track..\$5.00

MANUFACTURED BY...STARLINE, INC...Harvard, Illinois..Albany, N.Y.

Starline ALL STEEL COLUMNS • • • No. 626

STARLINE All Steel Column will support more than a wooden post twice its size. It offers less obstruction to light and air circulation. It is more sanitary and easily cleaned.

Its strength is in the steel itself. The material is of even thickness. It is not a mere shell in which to build a column of concrete. In fact, no filling is needed.

SAFE LOAD IN TONS

(One-fourth of Ultimate Capacity)

Columns (O.D.)	7 ft.	8 ft.	9 ft.	10 ft.	Weight Per Foot
2 $\frac{3}{8}$ in. . .	4	3 $\frac{1}{2}$	3 $\frac{1}{2}$		3 $\frac{1}{2}$ lbs.
3 in.	5 $\frac{1}{2}$	5	4 $\frac{3}{4}$	4 $\frac{1}{2}$	3 $\frac{1}{2}$ lbs.
4 in.	9 $\frac{3}{4}$	9 $\frac{1}{4}$	8 $\frac{3}{4}$	8	6 lbs.
5 in.	14	13 $\frac{1}{2}$	13	12 $\frac{1}{2}$	7 $\frac{1}{2}$ lbs.

The sizes commonly used are the 2 $\frac{3}{8}$ in. and 4 in. columns.

All STARLINE Columns finished in gray enamel.

No. 956 Hot galvanized inside and out at slightly additional cost.

Overall length of column includes cap and base unless otherwise specified.

No. 1254 STARLINE COLUMN SAVER

Prevents Columns Rusting Off at Floor Line

Regardless of the grade of material used or of strength when new, steel columns placed at or near the gutter become badly weakened by rust because of their constant association with wet bedding.

There are many cases where first grade columns installed twenty years ago have rusted off completely and where cheap columns have rusted through in seven to ten years.

STARLINE Column Saver is a heavy cast iron base. It is practically rust proof. It holds the bottom of the column six inches above the danger line.

It is virtually an old age insurance for four-inch steel columns. The additional cost is very slight because a six-inch shorter column can be used and the ordinary type of column base is replaced.

For four-inch columns only. Weight each, 23 pounds.



Steel Columns resting on column savers in the barn of W. J. Heatley near Walworth, Wis.

No. 956



No. 1254

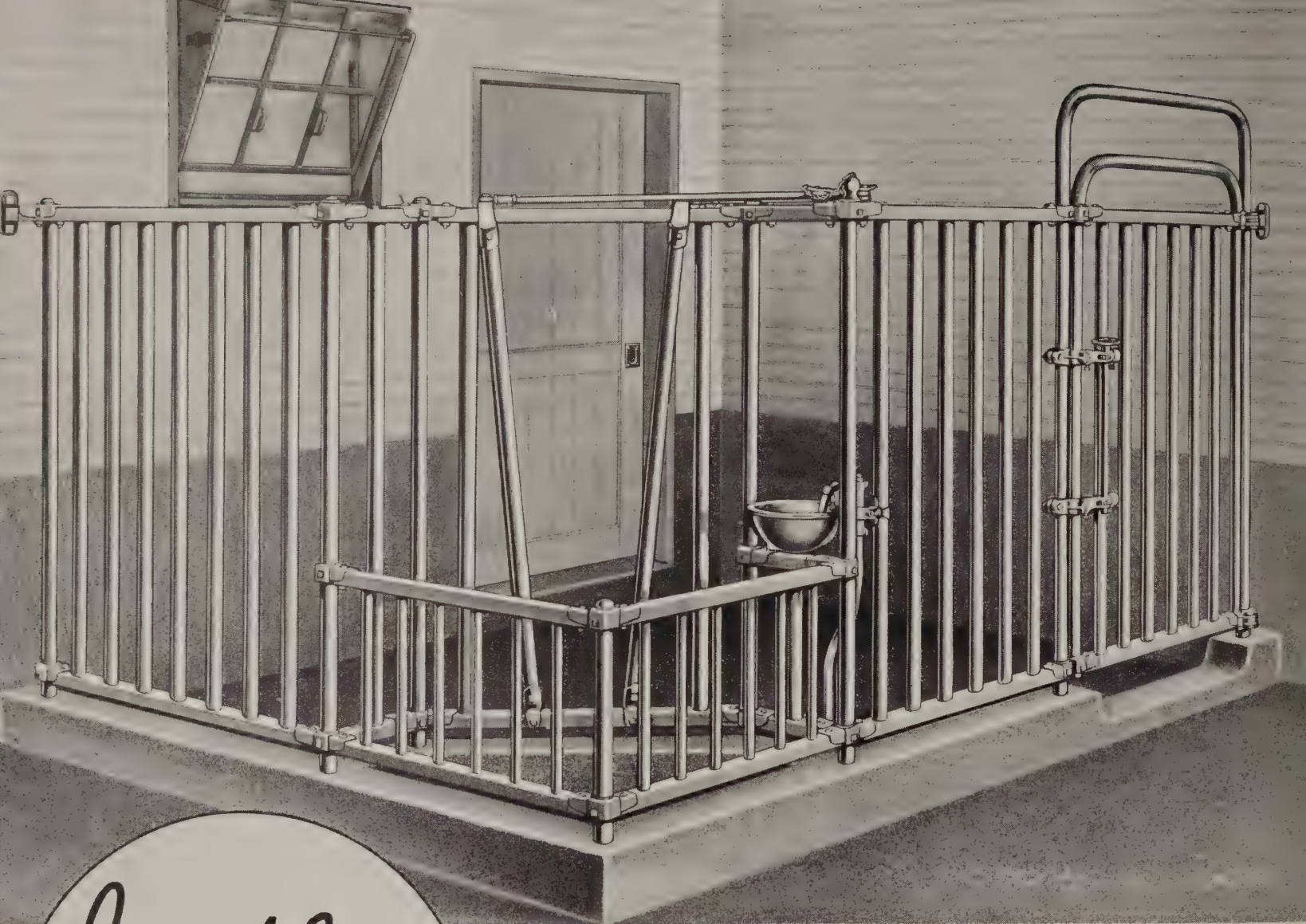
PAT. PENDING



S T A R L I N E

I N C.





PATENTED

Insure

**THE HEALTH AND
VITALITY OF THE
HERD SIRE**

No. 630 STARLINE STEEL BULL PEN

Much depends on the health and vitality of the herd sire. His quarters should provide for moderate exercise where he will be comfortable, absolutely safe and at the same time, within sight of the herd.

The gate is built in an arch. It cannot possibly sag. The gate swings on offset hinges. It can be swung back flat against the panel so as not to obstruct the passageway in front.

The gate swings within another arch which provides a rigid and continuous connection between adjacent sections of the pen.

The gate lock is a double barrel spring bolt. It locks automatically when the gate is operated. It can be opened only by turning the hand wheel.

The corner manger section includes a lever

operated stanchion that is adjustable in neck width and made of 1½ in. pipe. Must be specified. Manger rail 18 in. high prevents feed from being nosed out of manger.

Water Bowl installed as shown rests on a heavy rectangular cross member. It cannot be knocked off from above or below. Must be specified.

Pens can be made of any size. They are usually installed so that the walls of the building form at least one side of the pen or two sides as shown above.



These light and airy quarters are provided for the calves and growing stock in the barn of Mr. Henry E. Cutler near Lowell, Indiana.

STARLINE ALL STEEL PENS

STARLINE steel pens are the finishing touch to the equipment of the modern practical barn. The bull pen illustrated on the opposite page provides a place where the head of the herd will be comfortable, absolutely safe, and at the same time within sight of the herd. Cow pen provides a place for a sick cow or for a cow on test. It also provides clean, roomy quarters for the calving period, where the cow may be quiet, comfortable, easier fed and have plenty of light and fresh air.

The bull pen is 5 ft. 2 in. high from the pen floor. The top and bottom rails are of $1\frac{1}{2} \times 2\frac{1}{2}$ -inch O D rectangular steel tubing laid flat. The uprights are of $1\frac{5}{8}$ -inch O D round steel pipe. They are set 6 inches apart. The ends of the uprights are inserted into the top and bottom rails. Heavy tie rods extending down through the uprights hold the top and bottom rails together and make a rigid construction.

Bull pen stanchion is made of two U-bar steel uprights like those used in the Giant stanchion and the wood-linings are fitted into it the same way. They are adjustable in neck width.

The Starline cow pen is constructed like the bull pen, the top and bottom rails being of $1\frac{1}{2}$ -inch square steel tubing. The corner posts are of $1\frac{5}{8}$ -inch O D steel pipe and upright bars of $1\frac{1}{16}$ -inch O D steel pipe placed 5 inches apart on center. The cow pen is 4 ft. 8 in. high from the pen floor and the stanchion furnished with the cow pen is just like that in the bull pen. The calf pens are constructed just like the cow pens but are not quite so high. They measure 3 ft. 9 in. from the pen floor.

They are usually provided with stanchions along one side which open and close all at one time or one at a time.

All Starline pens are assembled in panels of any desired length.

Starline pen gates are a distinctive feature. They are hung on offset hinges which allow the gates to swing back flat against the pen when open. They are fitted with extra heavy spring locks which lock automatically and cannot possibly be opened by accident. The bull pen gate is 4 feet wide. The cow pen gate is 3 ft. $4\frac{1}{2}$ in. wide. The calf pen gate is 3 ft. $4\frac{1}{2}$ in. wide. Gates may be swung between two posts running to the ceiling instead of in the outer arch as shown in the illustrations.

Starline pens are regularly furnished in gray enamel.





How STARLINE Water Bowls Increase Production and Profits



YOU don't have to wait for results where Starline water bowls are used. The very next morning after the water is turned on in the bowls you get more milk.

More Drinking Water Means More Milk

Milk being 87% water the cow naturally cannot produce to her full capacity unless she gets plenty of water to drink and the cow that can drink whenever she wants it will drink almost again as much as if her drinking were regulated by the number of times she gets to the outside tank.

Cows Drink At Night Or Any Other Time

Starline water bowls keep fresh water before the cow all the time, constantly inviting her to take another drink, at meals, between meals and even at night. Some cows drink more between 5 and 12 P. M. than they do during the balance of the 24 hours.

Increase in Milk Flow Easily Measured

Starline water bowls raise milk production anywhere from 10 to 20%, depending on how the cows were watered before the bowls were installed—and it's easy to measure or weigh the additional milk produced.

Even on moderately cold days, no cow drinks as much of the chilly water in the unsheltered yard as she would drink of tempered water inside the barn.

If she drinks only two or three times a day she fills up on cold water each time. She becomes thoroughly chilled. The milk-making process stops until the cow recovers her normal body warmth after returning to the barn.

Work Under Any Pressure—Installed Anywhere

Starline bowls work under any pressure, can be piped from above or below and attached to any kind of steel or wood equipment.

Star Water Bowls are all equipped with individual pressure regulators that can be set to accommodate the requirements of each cow.

They are tapped for 1-in. pipe which is large enough even under the lowest pressure to bring water as fast as any cow can drink it. They can also be furnished for use with $\frac{3}{4}$ -inch pipe when desired.

Starline bowls are easiest to clean because there are no working parts in the bowl.

The valve lever raises clear up out of the bowl so that the bowl does not have to be detached for cleaning. The bowl is perfectly smooth inside. It's as easy to clean as a tea-cup.

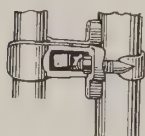
Easiest to Install
Easiest to Clean
Easiest for Cow to Work
Piped from above or below



Fig. 235

Furnished for $\frac{3}{4}$ -in. pipe when so specified.

The valve of the bowl is built with a watch-like precision. There is a cap on the end of the valve stem to take up what little wear there might be either on the end of the valve stem or where it passes through the stainless steel bushing in the valve cap. These fit within .001 of an inch. Retaining washers for the valve spring and fuller ball are die-formed within limits of .002 of an inch. Even the brass cap which holds the fuller ball in place is an accurate fit. This precision means long life, easy operation and perfect satisfaction with Star Water Bowls.



No. X744 Clamp

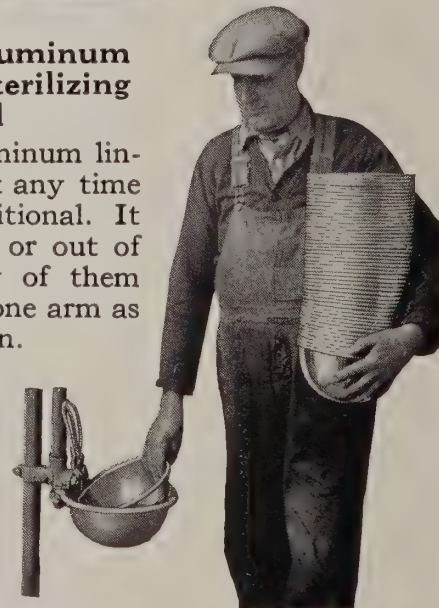
Fastens bowl or supply pipe to either wood or any kind of steel stalls. One is included with each bowl.

The valve construction shown on the opposite page is entirely of brass so it cannot rust or corrode. The valve sets in a horizontal position; it cannot be clogged by sediment. Sediment settles away from the valve in the bottom of the chamber.

Spun Sheet Aluminum Lining Makes Sterilizing Practical

No. 1179 Aluminum lining can be added at any time for a few cents additional. It is easily slipped in or out of the bowl and fifty of them can be carried in one arm as shown in illustration.

The whole fifty can be scalded at one time in an ordinary wash boiler on the kitchen stove.



You Can't Buy Better Water Bowls



PATENTED

Before the present type of STARLINE Bowls was designed, STARLINE representatives everywhere submitted a long list which included every objection that had ever been raised against any kind of a drinking bowl.

The STARLINE Bowl was designed to eliminate every one of these objections and to get away from the common complaint that the working parts wore out too rapidly and that bowls are hard to clean without taking them off.

Here are some of the reasons why STARLINE Bowls are best.

1. Easiest for cows to operate. Valve opens when cow rests chin on valve lever; snaps shut when cow quits drinking and lifts her chin.
2. Valve lever swings back, not down. Gives full depth of bowl to drink. No danger of sucking up air.
3. Valve lever moves back up—not down—cannot be clogged by silage or feed in bowl.
4. Valve lever raises clear of bowl; bowl does not have to be taken off for cleaning.

5. Valve lever locks up; prevents water being turned on, when it is desirable to shut it off. Falls back into position when lock pin is lifted.
6. Valve lever shaped to prevent cows from lapping and spilling water.
7. All brass valves. Cannot rust or corrode.
8. Horizontal valve cannot be clogged by sediment.
9. Valve fits above the bowl so that by drawing two bolts, it can be removed for replacement of worn fuller balls.





Starline Ventilators are Economical and Efficient

STARLINE ventilators are made of heavy copper-bearing galvanized material sturdily constructed and put together with rust resisting bolts and rivets.

The large flare base ventilators for barns and other high buildings have heavy interlocking corner braces and are securely anchored directly to the rafters of the building at each of the four corners. Heavy double air craft ribs stiffen the throat or stack and also the storm band and the flaring sections to which the storm band is bolted. Finished in weather-proof aluminum; made in the following sizes.

	Flue	Base	Height	Weight
No. 224.....	24 in.	40 in.	8 ft.	160 lbs.
No. 230.....	30 in.	51½ in.	9 ft. 5 in.	231 lbs.
No. 236.....	36 in.	60½ in.	10 ft. 9 in.	267 lbs.
AAA No. 130.....	30 in.	51½ in.	8 ft. 6 in.	191 lbs.
No. 430.....	30 in.	51½ in.	8 ft. 6 in.	191 lbs.

Lightning Rods can be attached at any time.

Taper Base Ventilators can also be equipped with lightning rod attachments.

Ornaments with weather-vane and cow, horse, hog or rooster can also be included with taper base ventilators.



TAPER BASE VENTILATORS—For Small or Low Buildings

Taper Base Ventilators are made in the following sizes:

	Flue	Base	Height	Weight
No. 12.....	12 in.	20 in.	33½ in.	45 lbs.
No. 16.....	16 in.	23 in.	40¼ in.	60 lbs.
No. 20.....	20 in.	28 in.	45½ in.	80 lbs.
No. 24.....	24 in.	33 in.	54½ in.	110 lbs.
No. 30.....	30 in.	42½ in.	67½ in.	160 lbs.
No. 36.....	36 in.	50 in.	79 in.	192 lbs.
AAA No. 30.....	30 in.	42½ in.	62½ in.	140 lbs.

SQUARE BASE VENTILATORS—(Not illustrated)

	Flue	Base	Height	Weight
112.....	12 in.	16 in.	30½ in.	35 lbs.
L-112.....	12 in.	16 in.	53½ in.	40 lbs.
116.....	16 in.	21 in.	32½ in.	50 lbs.
L-116.....	16 in.	21 in.	55½ in.	55 lbs.



ANY barn that is built tight and warm enough for extreme cold weather is bound to be too warm in ordinary times. A cow gives off heat just like a stove. But the fire in a cow never goes out. It cannot be checked or regulated. To get rid of excessive heat, foul air and moisture doors and windows may be opened, but on a still day that wouldn't do much good and on a windy day it's impossible to regulate them to avoid dangerous and costly drafts.

Starline Ventilation includes long flues starting within 18 inches of the stable floor and extending up into a base of the ventilator. The flues are insulated to prevent condensation where they pass through the loft. A tight base cover in the ventilator retains the full efficiency of the siphon action.

The foul air is taken off the floor at the base of the stable flue so as not to waste too much of the heat that the cows generate. But the section of flue in the stable is provided with a heat door up next to the ceiling so that air can be taken off the ceiling when it is desired to cool the building.

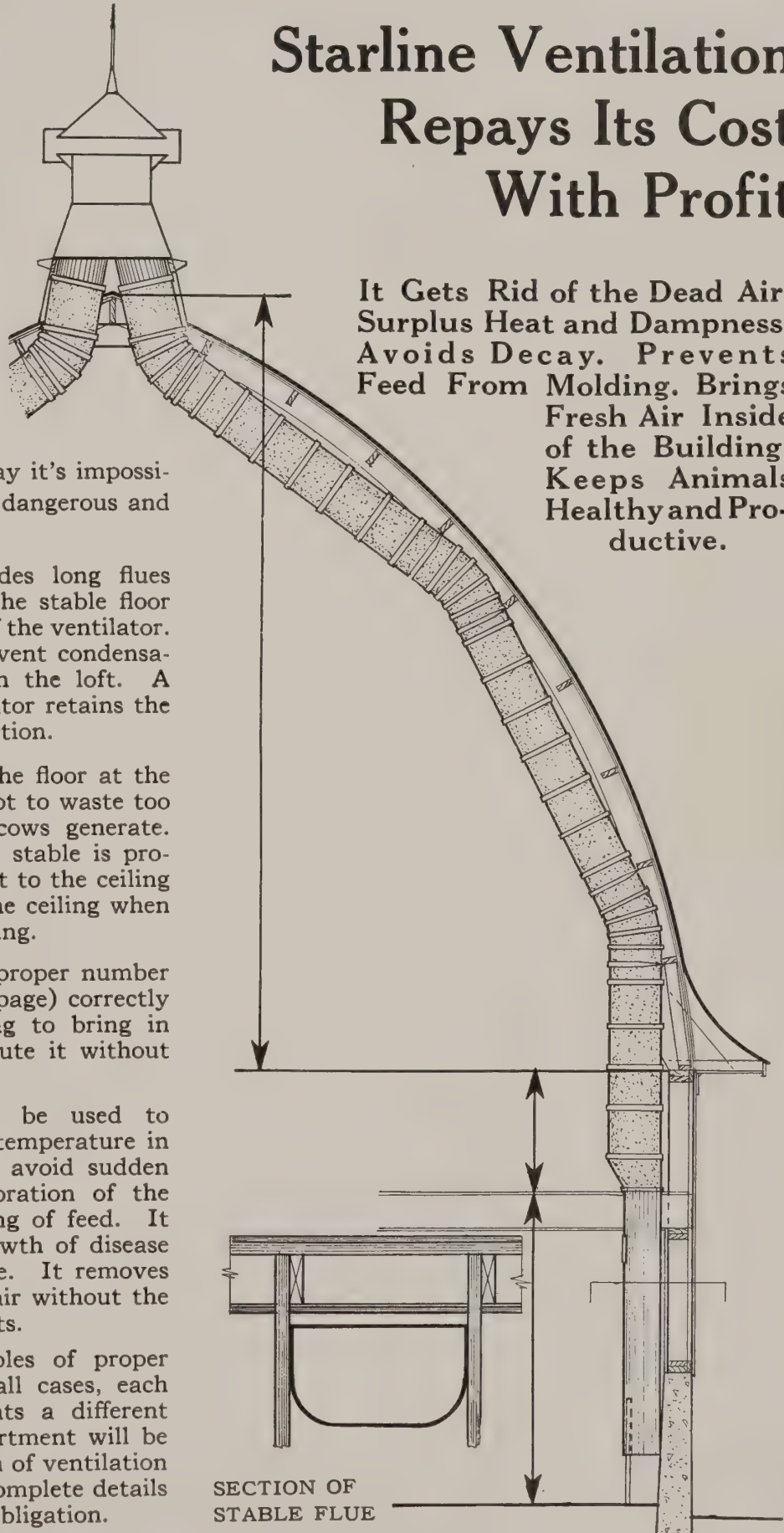
In addition there are the proper number of intakes (described on next page) correctly distributed about the building to bring in fresh air and properly distribute it without causing dangerous drafts.

Starline Ventilation may be used to maintain a comfortable even temperature in a properly built barn and to avoid sudden changes. It prevents deterioration of the barn structure and the spoiling of feed. It lessens the chance for the growth of disease germs by eliminating moisture. It removes bad odors. It supplies fresh air without the danger of air currents or drafts.

While the general principles of proper ventilation are the same in all cases, each barn to be ventilated presents a different problem. Starline Plan Department will be very glad to work out a system of ventilation for your barn and send you complete details without the slightest cost or obligation.

Starline Ventilation Repays Its Cost With Profit

It Gets Rid of the Dead Air, Surplus Heat and Dampness. Avoids Decay. Prevents Feed From Molding. Brings Fresh Air Inside of the Building. Keeps Animals Healthy and Productive.



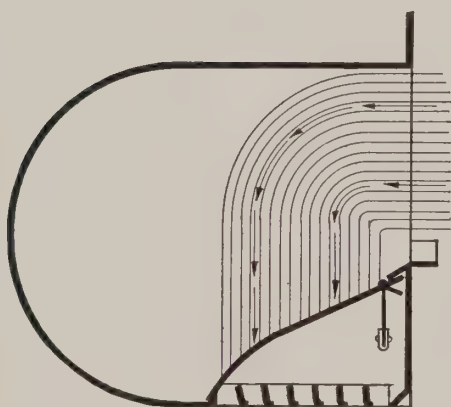


STARLINE Fresh Air Intake
PATENTED

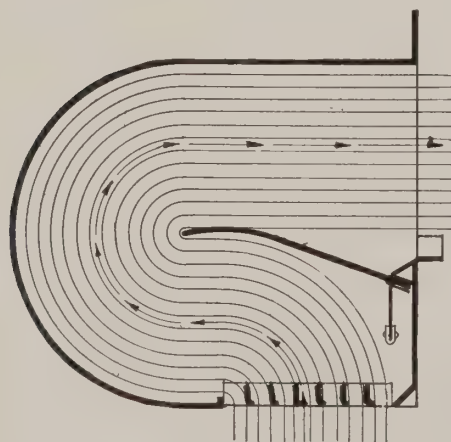
Let the Wind Blow

REGARDLESS OF THE SPEED
OR DIRECTION OF THE WIND
STARLINE INTAKES AUTO-
MATICALLY CONTROL AN
EVEN FLOW OF FRESH AIR
WITHOUT DANGEROUS DRAFTS

CONTROL BOX WITH AUTOMATIC DAMPER ALWAYS KEEPS INCOMING AIR UNDER CONTROL



Any tendency to "back draft" is promptly checked as the sensitive damper snaps shut the instant the air starts to back up. Damper stands in this position when no air is being drawn into building.



Counter balanced damper takes position shown above with a mild inward flow of air. This is the normal position of the automatic damper except when wind is very high.

Regardless of the speed or direction of the wind, each intake in the system brings in just about the same amount of air. This automatically provides an even distribution and diffusion of air. It prohibits dangerous drafts.

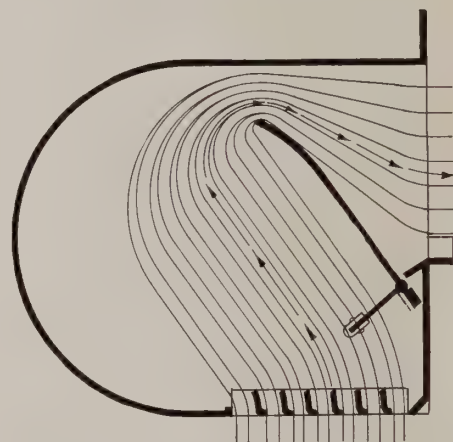
The air inlet at the control box being horizontal reduces the influence of the wind. The statically counter-balanced damper rises to an open position as air flows in through the control box. It remains in this position as long as the outtakes in the system continue to draw evenly. When a gust of wind increases the velocity of the air, it pushes the damper up into the position shown above at the right. As the damper rises, it picks up counter-weight. This weight brings the damper back to the normal position shown below at the left when the wind subsides.

A violent wind sufficient to raise the damper to the position shown in lower right hand corner almost closes the opening so that the volume of air entering the stable through any intake remains constant. The balance maintained between the velocity pressure and the weight of the counter balance automatically maintains the uniform flow of air. The air flow is equal to the velocity of the air current multiplied by the area of the opening.

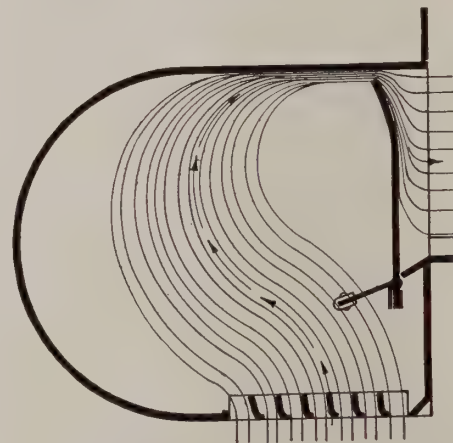
The damper never entirely closes. So it's impossible for a gust of wind in any direction either to close the intake or increase the amount of air entering the building at that point.

Control Boxes are made of 22 gauge copper alloy galvanized steel. Top, front, back and bottom are all of one piece—no joints.

They are used with both siphon and electric ventilation equipment.

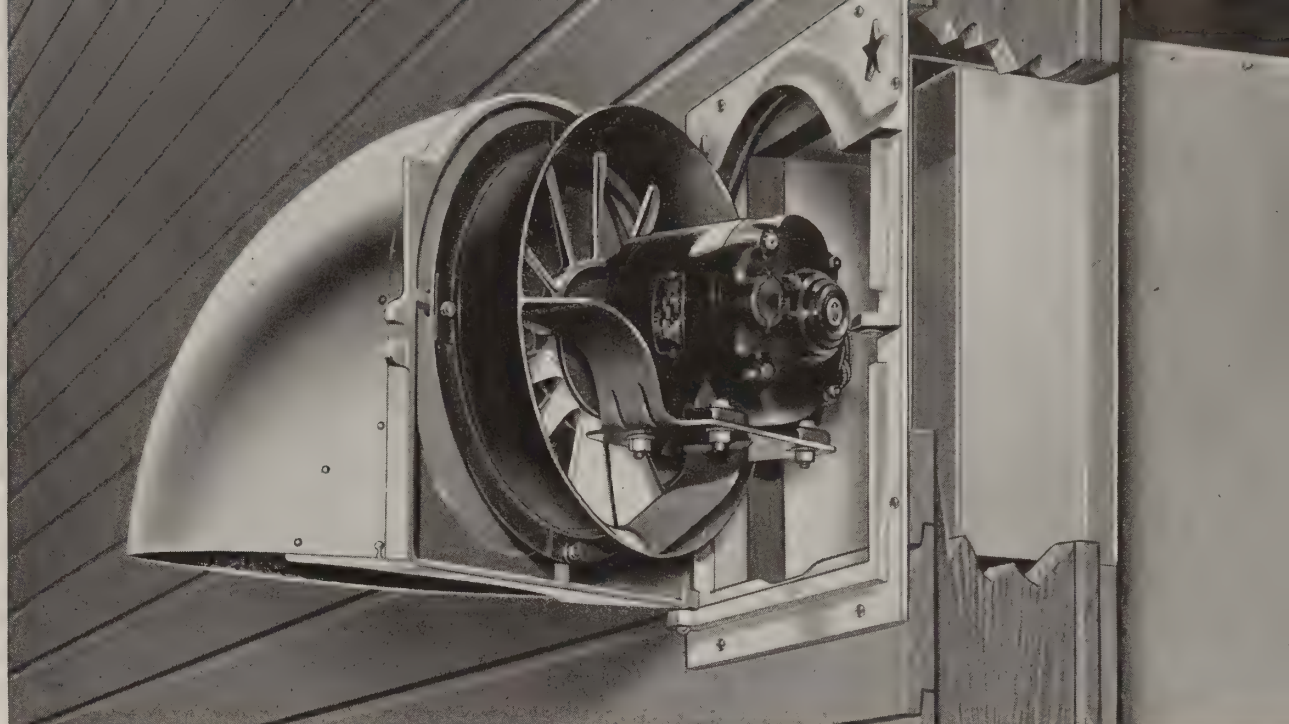


When the speed of the incoming air increases the damper moves up into this position. It partially closes the opening so that an even volume of air entering the building is maintained.



When the air rushes in still faster the size of the opening is still further reduced by the damper moving into an almost vertical position so that under any wind pressure there is an even volume of air entering the stable. Under an extremely strong wind the opening is almost closed.

Continuous
Positive
Ventilation
Without
Drafts or
Excessive
Cooling



PATENTED

STARLINE ELECTRICAL VENTILATION WORKS UNDER ALL CONDITIONS

STARLINE Electrical Ventilation is the most economical of the positive ways of removing dead air and excess moisture and maintaining an even temperature best suited to the health of the animals and the profit of the owner.

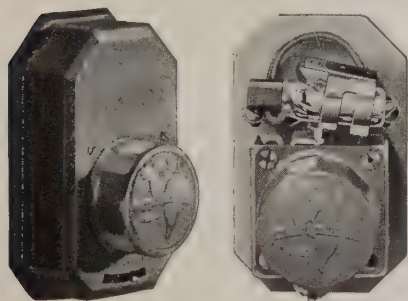
The intakes are like those illustrated on the preceding pages. The other elements of STARLINE Electrical Ventilation are the fan which draws the air from the building, the floor flue which brings excess moisture to the fans from the cool air at the floor—or takes warm air off the ceiling if the damper is so adjusted—and the thermostat which acts like a safety valve and can be set to shut off the fan at any desired temperature.

A master switch controls the fan circuit. Triple Acting Dampers in the stable flues can be set to take cold air off the floor and retain the animal heat, or to take warm air off the ceiling and cool the stable—or part from the floor and part from the ceiling.

The danger of drafts is avoided by using several fans instead of using one large fan to remove all the air from the stable at one point. This provides better diffusion and eliminates the possibility of dangerous drafts.

The fan is firmly bolted to the back of the heavy iron frame on which the hood and louvres are mounted. This is hinged to the massive iron base fastened to the wall. The frame can be swung out to inspect or oil the fan. Louvres drop shut when the fan stops and prevent wind blowing into the barn. The curvature of the hood is such that it has less effect on the efficiency of the fan than any other shape of hood. The insulating gasket under the ring prevents cooling the fan by outside contact; the fan remains at the inside temperature, preventing frost and condensation on the fan.

Double Pole Circuit Breaker enclosed in a steel box is supplied with each fan to avoid any possibility of motor burning out from an over-load.



No Danger of Cooling The Barn Too Much

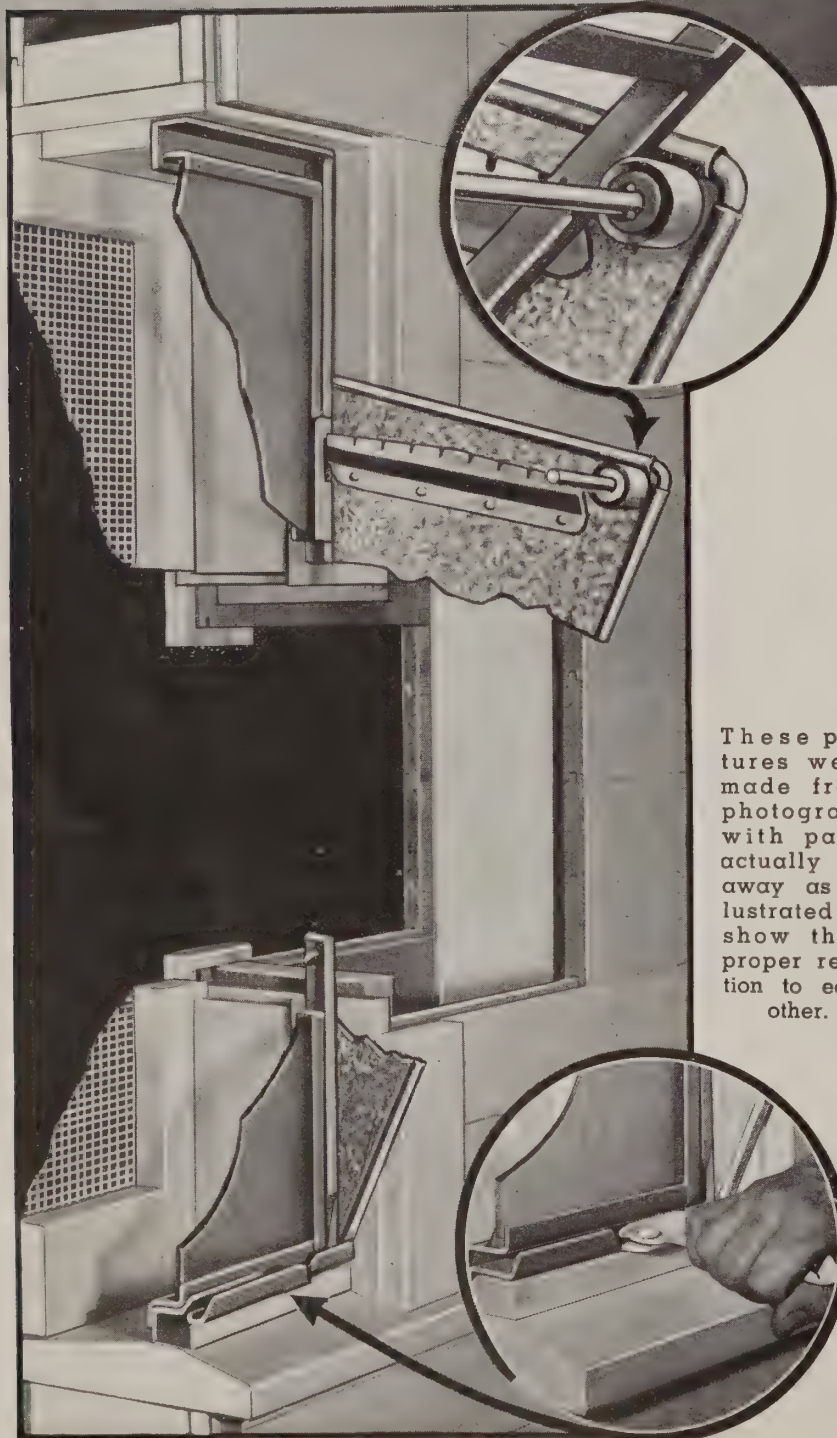
Severe drops in the stable temperature are dangerous and expensive. They lower the vitality of the cow, waste feed and reduce the flow of milk. This danger and expense are eliminated by highly sensitive thermostats which automatically shut off the fans when the temperature gets to the danger point.

It turns the fans on automatically when the barn has warmed up three degrees above the minimum at which you set the thermostat.



S T A R L I N E I N C.





These pictures were made from photograph with parts actually cut away as illustrated to show their proper relation to each other.

THE END OF WINDOW TROUBLES

The STARLINE *Roll-Up* Structural Steel Window can be set to control the flow of fresh air into the building according to weather and temperature. Easily tilted, raised or lowered to let in fresh air in amounts desired—above or below the sash.

Locks into any position.

STARLINE windows put an end to rotting sash and frames, to sash that rattle from shrinkage, to glass breakage that comes from trying to open windows that have swollen tight.

Wings are tied together with a long tie rod. They can't spread. This tie-rod acts as a safety bar. No matter what happens, the operator's head is safe; the sash cannot fall.

On both ends of this tie rod are hard wood rollers carrying the weight of the sash so that the sash rolls up or down easily. The lower end of the sash is guided in the window frame. There is no need of balancing the heavy sash in mid-air to adjust its position.

Entire wing edge rolled into a tube. No gap in the reinforcing.

Rain beating against the windows when the window is tilted, or frost which melts and runs down, drains outside the building.

Weight of sash seals it to frame when closed and locks at all four corners.

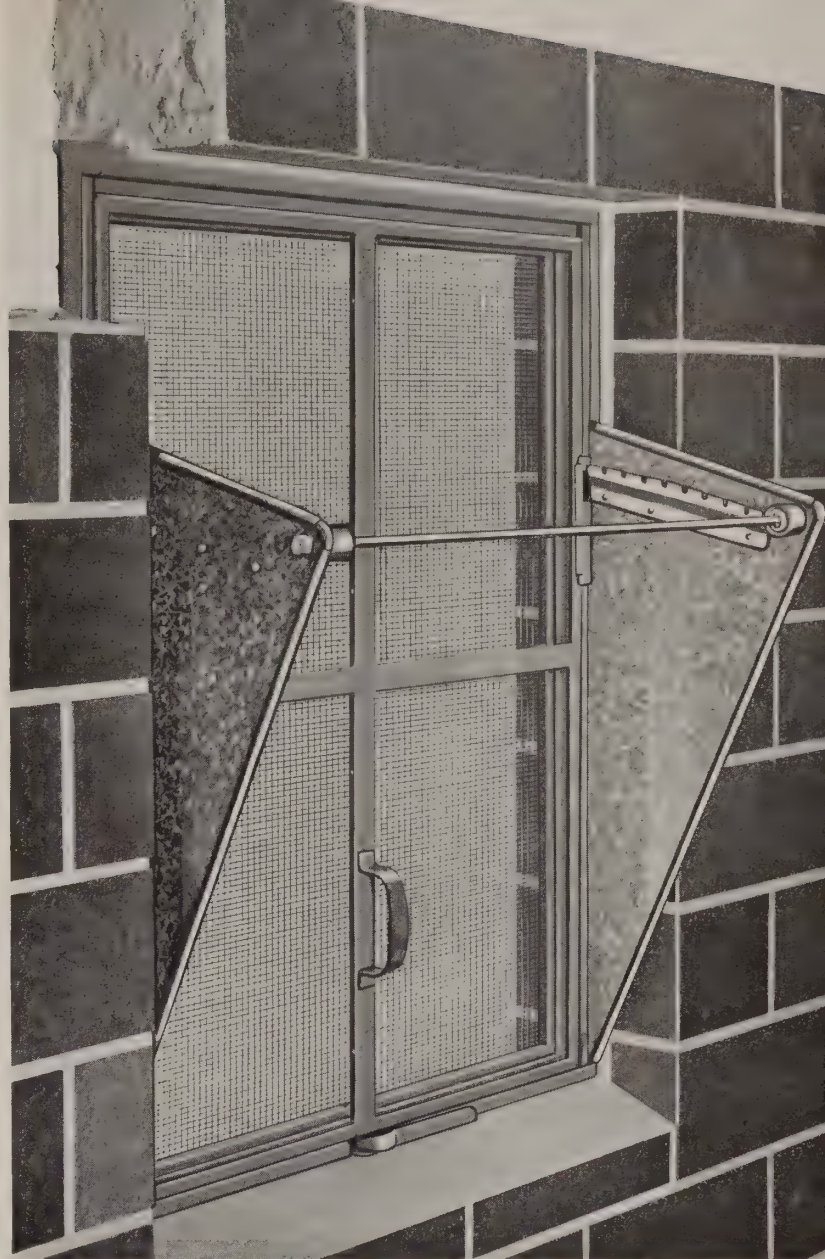
If the window freezes shut, the long handled seal-breaking cam pivoted to the lower frame "jimmies" the window loose.

The largest size STARLINE Roll-up Window can be placed within 3½ inches of the ceiling without interfering with adjustment of the sash to any position.

STARLINE ROLL-UP Structural Steel WINDOWS

EASILY INSTALLED IN WOOD
OR MASONRY WALLS

Roll up or down easily.
Up out of the way when not in use.
Seals tight when closed.
Seal breaking cam loosens sash quickly.
Sash locks into frame.
Wings cannot spread.
Sash cannot fall and break.
Allow use of screens or storm sash.
Sash cannot shrink and rattle.
Cannot swell shut.
Can be installed within a few inches of ceiling
without interfering with adjustment to any position.
All joints are welded. Spring clips furnished to
hold glass in place.
Shipped unglazed.
 $\frac{3}{16}$ in. ribbed glass priced and shipped separately.
Complete instructions with each shipment or
mailed on request.



Screen Not Included

FOR WOOD WALLS

(Cannot be used in masonry walls)

Frames 1 x 1 steel angles .109 in. thick.
Wings 24 gauge galvanized copper alloy with edges rolled
and $\frac{3}{8}$ in. reinforcing rod at corners.
Adjusting Bracket steel Z-Bar .093 in. thick with 9 notches 1 in.
apart.
Tie Rod for wings $\frac{5}{16}$ in. cold rolled steel.
Sash Rollers 1 x $1\frac{1}{4}$ in. oiled maple.
Sash Rails 1 x $\frac{1}{2}$ in. steel angles .109 in. thick.
Sash Bars 1 x 1 steel T-Bars .129 in. thick.
Seal Breaking Cam channel steel $5\frac{3}{4}$ in. long.
Frames have screw holes for fastening to walls.

WOOD WALL SIZES AND WEIGHTS

No.	Glass	Approximate Opening Size		Sq. Ft. Glass	Weight With Wings No Glass or Putty
		Width	Height		
1351	4L—10x12	22 $\frac{3}{8}$ "	26 $\frac{3}{4}$ "	3 $\frac{1}{2}$	28 lbs.
1353	6L—10x12	32 $\frac{3}{4}$ "	26 $\frac{3}{4}$ "	5	36 lbs.
1355	9L—10x12	32 $\frac{3}{4}$ "	39"	7 $\frac{1}{2}$	43 lbs.
1352	4L—12x16	26 $\frac{1}{4}$ "	34 $\frac{5}{8}$ "	5 $\frac{1}{3}$	36 lbs.
1354	6L—12x16	38 $\frac{3}{4}$ "	34 $\frac{5}{8}$ "	8	43 lbs.
1357	6L—10x12	22 $\frac{3}{8}$ "	39"	5	36 lbs.

STEEL SASH PUTTY EXTRA—Putty per 100 lights: 10x12.....60 lbs. 12x16.....70 lbs.

Do not try to install windows without complete directions. See "Transom Windows" for sash one-light high

FOR MASONRY WALLS

(Can also be used in wood walls)

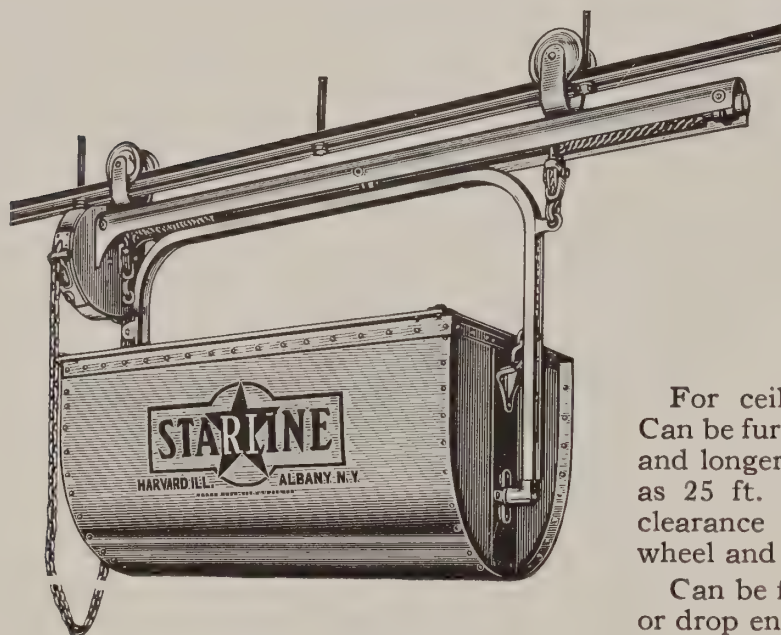
Frames Z bars $\frac{7}{8}$ x $1\frac{1}{4}$.109 in. thick.
Wings 24 gauge galvanized copper alloy with edges rolled
and $\frac{3}{8}$ in. reinforcing rod at corners.
Adjusting Bracket steel Z-Bar .093 in. thick with 9 notches 1 in.
apart.
Tie Rod for wings $\frac{5}{16}$ in. cold rolled steel.
Sash Rollers 1 x $1\frac{1}{4}$ in. oiled maple.
Sash Rails 1 x $\frac{1}{2}$ in. steel angles .109 in. thick.
Sash Bars 1 x 1 steel T-Bars .129 in. thick.
Seal Breaking Cam channel steel $5\frac{3}{4}$ in. long.

MASONRY WALL SIZES AND WEIGHTS

No.	Glass	Approximate Opening Size		Sq. Ft. Glass	Weight With Wings No Glass or Putty
		Width	Height		
1341	4L—10x12	23 $\frac{1}{8}$ "	27 $\frac{1}{2}$ "	3 $\frac{1}{3}$	30 lbs.
1343	6L—10x12	33 $\frac{1}{2}$ "	27 $\frac{1}{2}$ "	5	36 lbs.
1345	9L—10x12	33 $\frac{1}{2}$ "	39 $\frac{7}{8}$ "	7 $\frac{1}{2}$	45 lbs.
1342	4L—12x16	27"	35 $\frac{1}{2}$ "	5 $\frac{1}{3}$	38 lbs.
1344	6L—12x16	39 $\frac{1}{2}$ "	35 $\frac{1}{2}$ "	8	45 lbs.
1347	6L—10x12	23 $\frac{1}{8}$ "	39 $\frac{7}{8}$ "	5	36 lbs.



Starline Litter Carriers Cut Out Waste, Work and Worry



No. 411 HIGH LIFT STREAMLINE LITTER CARRIER

*Raises Higher . . .
... Drops Lower*

For ceilings up to 9 ft. high. Can be furnished with longer chains and longer shafts to lower as much as 25 ft. Requires only 42 inch clearance between top of track wheel and bottom of tub.

Can be fitted with plain feed tub or drop end feed tub.

WITH a Starline carrier the barn can be thoroughly cleaned in one-fourth to one-half the time it takes to do half a job with a wheel barrow.

On top of the disagreeable back-breaking labor that it cuts out, it pays for itself over and over again.

When you put in extra time and extra work in your fields you get a better crop. But extra time applied to doing that same job of cleaning the barn is just extra time. Cleaning behind thirty cows in an average size dairy barn sixty feet long means about eight wheel barrow trips a day. These trips average 250 feet. That amounts to well over one hundred miles in a year—pushing tons and tons of weight—making liberal allowances for the days when the cows are in the pasture.

No one would think of walking a hundred miles with a loaded wheel barrow if his only pay was what it costs to own a litter carrier for a year.

If the Starline carrier saved only one hour a day, the actual money value of the time saved would pay for a carrier in two or three years, and many carriers which have been in use for twenty years look as if they were good for twenty more.

Above is shown the big heavy No. 411 Litter Carrier which operates on a rigid double angle track. It's a heavy carrier for heavy work. It raises and lowers easily and quickly and takes out ten bushels at a time.

The track is easy to put up by means of lag screw hangers shown at the right. They come in any length you want. By means of switches, curves, lift-out sections, swinging booms, and other fittings the track can be made to conform to any arrangement inside or outside the barn.

This big carrier is always ready for work—the heaviest and dirtiest work on the farm. It is used oftener than most mechanical equipment and costs much less than many good labor savers which are not used half as much.

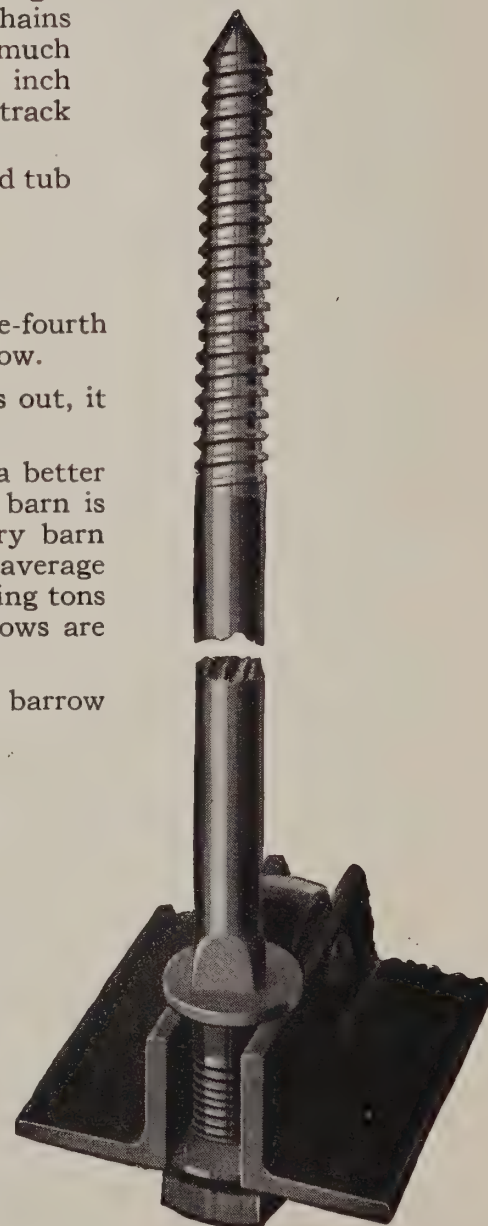


Fig. 414



Combination Carriers Dump and Return Automatically

HERE'S the Starline Combination Carrier, which operates on rigid track inside the barn and cable track outside.

It combines the raising-lowering feature and other advantages of a rigid track with the quick automatic returning feature of the regular cable track carrier.

Below is shown No. 595 Giant Suspension Bracket which makes a smooth straight connection between the rigid track inside the building and the cable track outside. There is no offset where the Starline bracket is used. This makes it possible to get a running start with a loaded carrier, give it a good shove at the door so that it goes out, dumps, and returns automatically.

The tub can be made to dump at any point along the outside cable track by placing the trip block at the proper place on the track. You can make the tub dump either to right or left by loading it a little heavier on that side.

Hangers for the double oval track used with this carrier can be furnished in any practical length. Switches and curves are also available so that the trackage system can be laid out in accordance with any inside barn arrangement.

It's so easy to clean a barn with a Star carrier that it's a constant invitation to keep the barn cleaner than it otherwise would be kept.

A Starline litter carrier outfit costs mighty little in proportion to the amount of labor that it saves during the year in that it takes care of the meanest job on the farm.

Star Litter Carriers are made in other styles than the two shown here. Star carriers for feed are also offered in several designs.

Send us a rough sketch of your barn giving length and width and distance from barn to dump and get complete description and figures on the kind of carrier and equipment that best fits your needs.

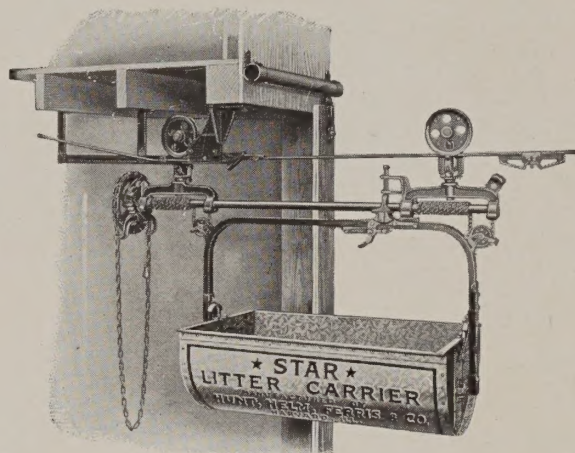


Fig. 592

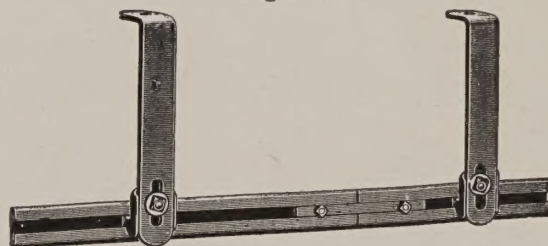


Fig. 593

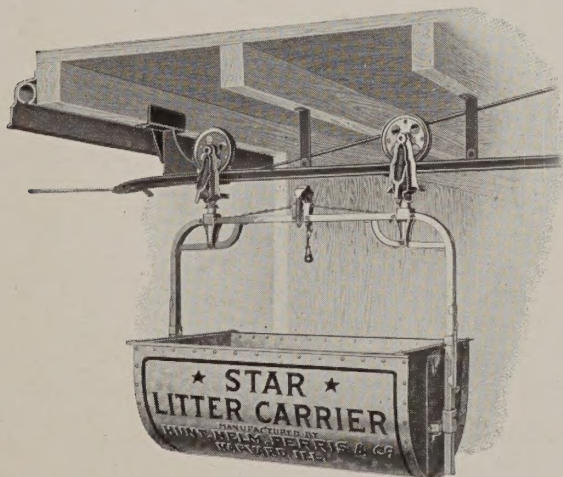


Fig. 693

The above litter carrier operates on rigid track inside the barn, if desired, in a manner similar to the No. 592 carrier shown above on this page. But because it is not fitted with the raising and lowering device it is generally limited to use on rod track. The tub measures 26 inches by 41 inches and is 14 inches deep.

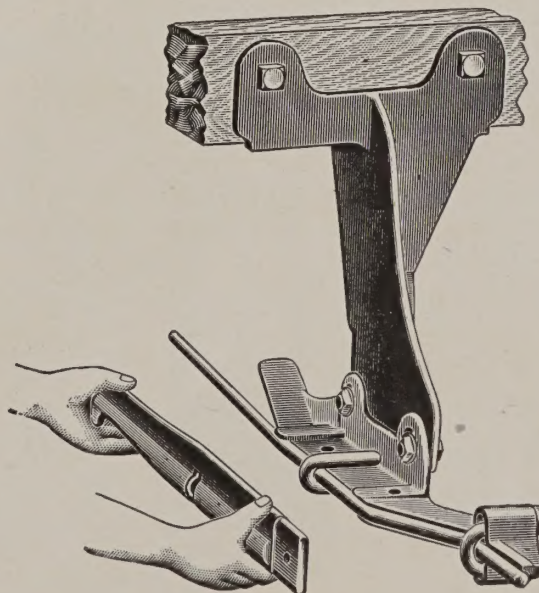
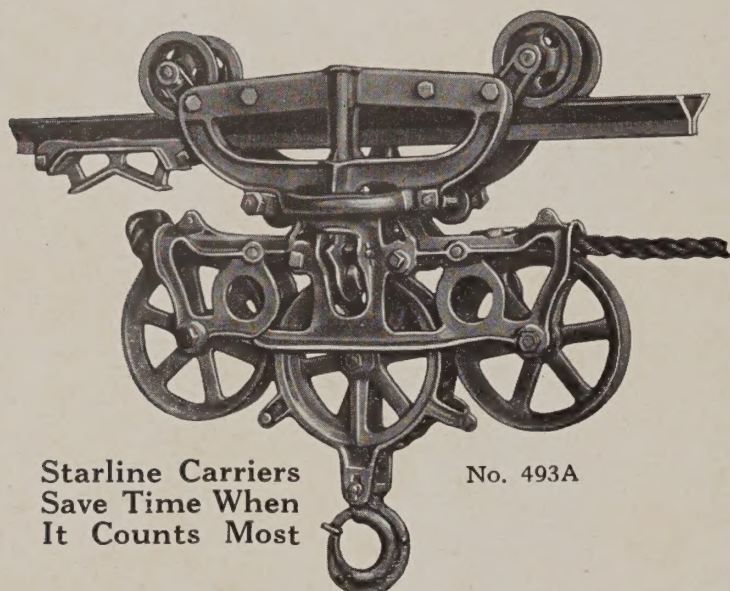


Fig. 595



How Starline Hay Carriers Cut Haying Cost



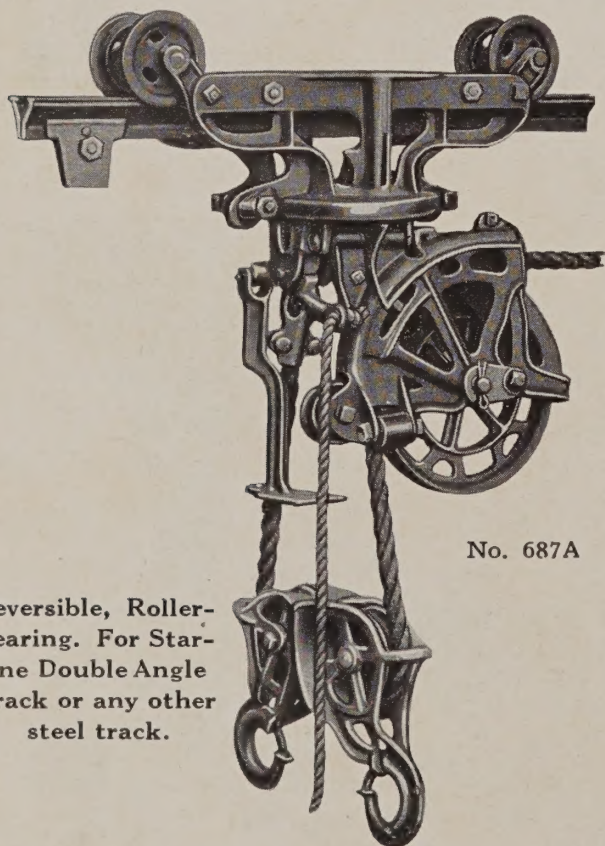
Starline Carriers
Save Time When
It Counts Most

No. 493A

YOU can depend on Starline hay carriers to stand up during the merciless rush of the haying season.

Like many other pieces of equipment, a hay carrier is not used very long at a time but when it does work it works hard.

That's where Starline hay carriers show their superiority; every year they come back after the idle months, ready to do the big job that is cut out for them, easily and without lost time.



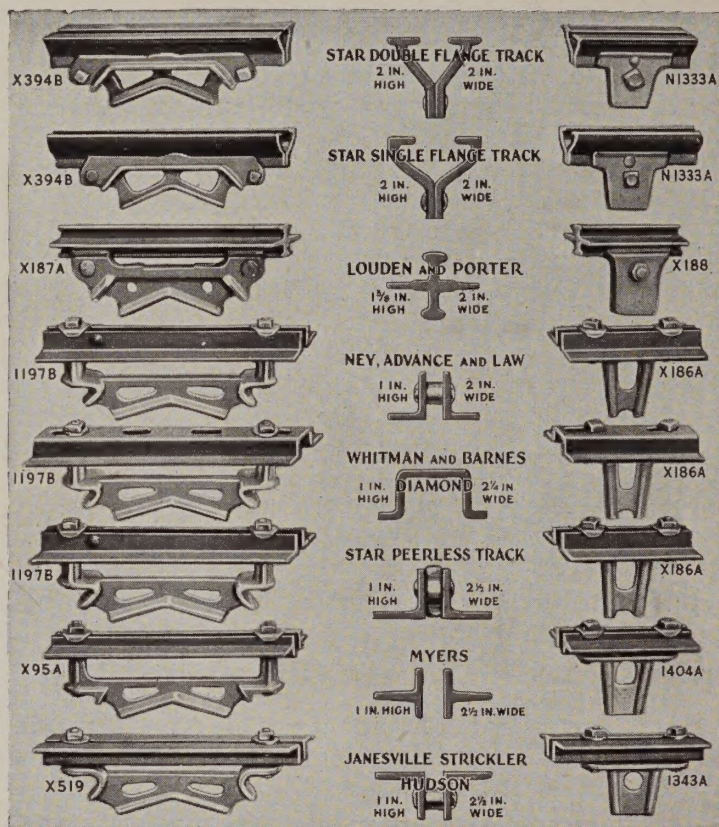
No. 687A

Reversible, Roller-Bearing. For Starline Double Angle Track or any other steel track.

The reliability of Starline hay carriers is not accidental. They were designed that way.

They're made in all standard styles for handling either slings or forks.

Starline hay carriers work on any kind of steel track. The accompanying illustration shows the several kinds of trip blocks used with tracks of different shapes.



The upper illustration shows the style of carrier that is used with forks.

The lower illustration shows the type that is used in connection with slings.

With this carrier the load can be raised to any desired height and freed from the trip block by a jerk of the rope.

It is reversible like the fork carrier shown above so that hay can be taken in from either end or both ways from the center of the barn.

It's so designed that the load is always center hung and the carrier is evenly balanced. This distributes the load evenly to all four wheels and gives an even balance on both sides of the track so that the carrier always runs smoothly.

Starline dealers everywhere carry the kind of carriers used in their respective localities.

If your old carrier is worn out it will pay to replace it with a new Starline carrier. It will operate on your track. If you are putting up a new barn and need a complete new outfit, be sure to use Starline double angle track, because it is deeper and stronger and easier to put up and lines up more evenly at the joints.

No. 651

**WICK
OILER**

PAT. NO. 2,151,590

END
VIEW
OF TRACK
and cut-away
wheel.

Actual Size

This quantity of oil
goes in each Cannon
Ball Wheel.

Keeps bearings
lubricated and
protected from
rust.

ROLLS LIKE A BALL
IN SELF-CLEANING 13 GAUGE TRACK

Hangers adjustable
up or down
— in or out.

Only **SELF-OILING CANNON BALL**

— HAS LIFETIME LUBRICATION

With this new Cannon Ball feature, door hanger life is more than doubled. This lifetime lubrication is injected at the factory into the felt packing of every Cannon Ball Door Hanger Wheel. The persistent and ever present oil film eliminates any chance of rusting the 10 extra long bearings that make Cannon Ball work so much easier and last so much longer. Again Starline proves its leadership. Write today for complete information on this revolutionary feature and others equally important. They put an end to all rolling door troubles.

No. 681

No. 777

No. 933

CANNON BALL UP AND OVER DOOR HARDWARE

In the popular Up and Over Garage Door Sets, Cannon Ball Self-Oiling Door Hangers assure the easiest, most trouble-free operation at all times. Its additional strength and the new self-oiling feature make it the outstanding set on the market.

